International Association of Oil & Gas Producers

NOPSEMA

Reports 592 & 594

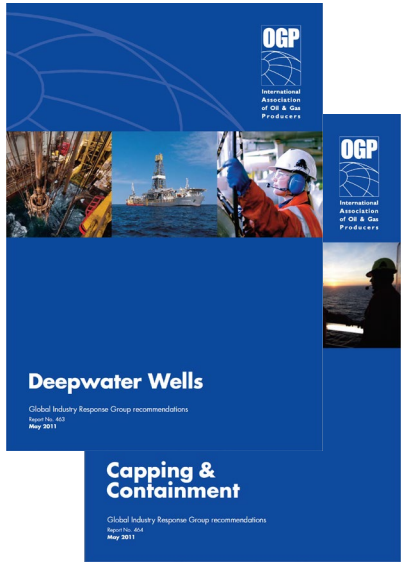
Preparing for SSC Response & Optimising Timelines

APPEA Conference 2021

Pat Brenan & Andrew Best

Manuscript ID: AJ20041.R2

Wells Expert Committee (WEC) & Subsea Well Response and Source Control Subcommittee (SWRSC)



- Established in June 2011, WEC has become the global voice of Operators and a relevant and effective technical authority on the prevention and mitigation of high consequence well control events.

- The SWRSC was formed in 2017 and aims to:
  - Be a centralised source of industry knowledge and shared experience in subsea well response and source control
  - Support IOGP member organisations and the broader E&P industry engaged in subsea activity
  - Provide a forum for industry to identify technical areas where further development may be warranted

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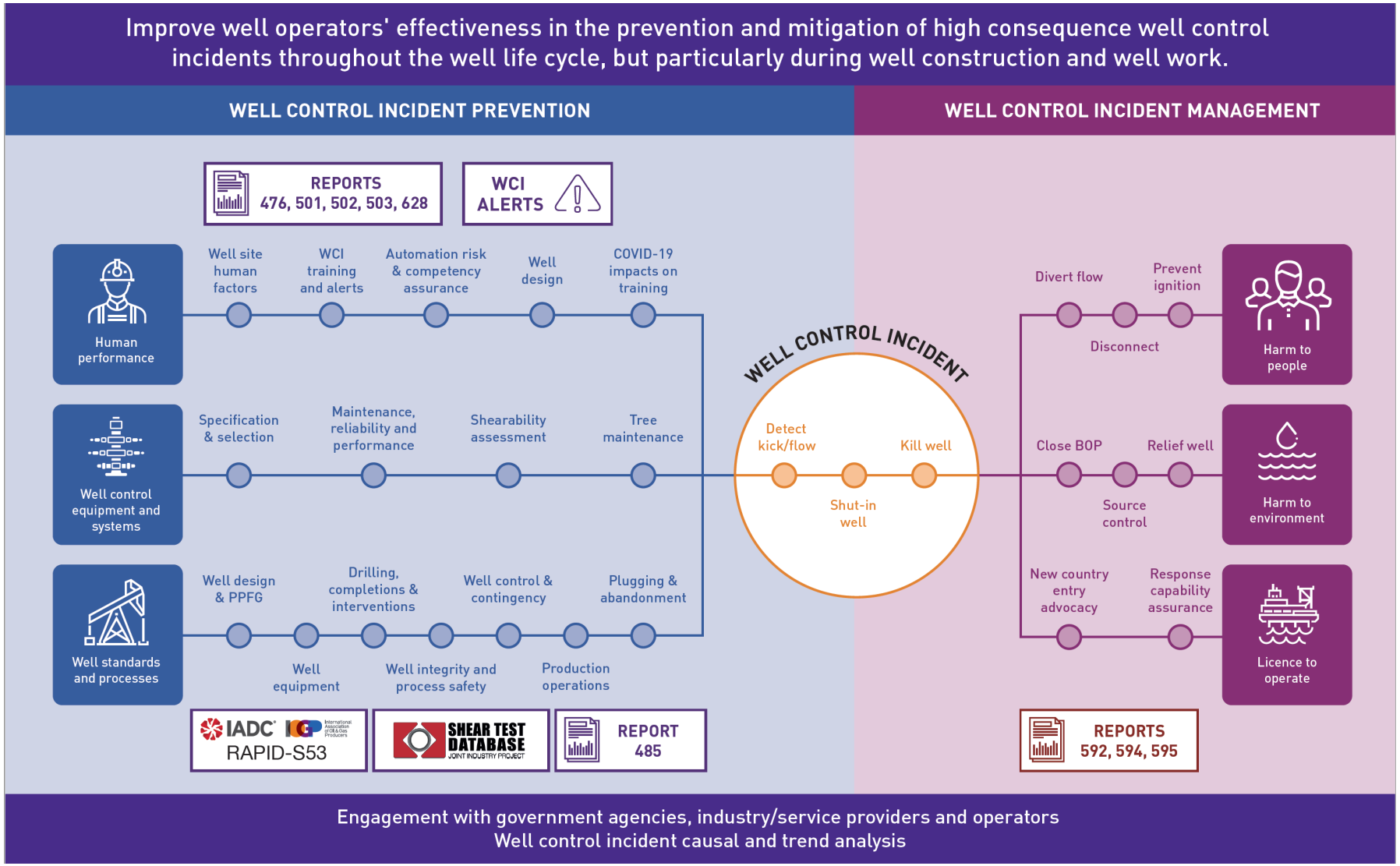
WEC Framework



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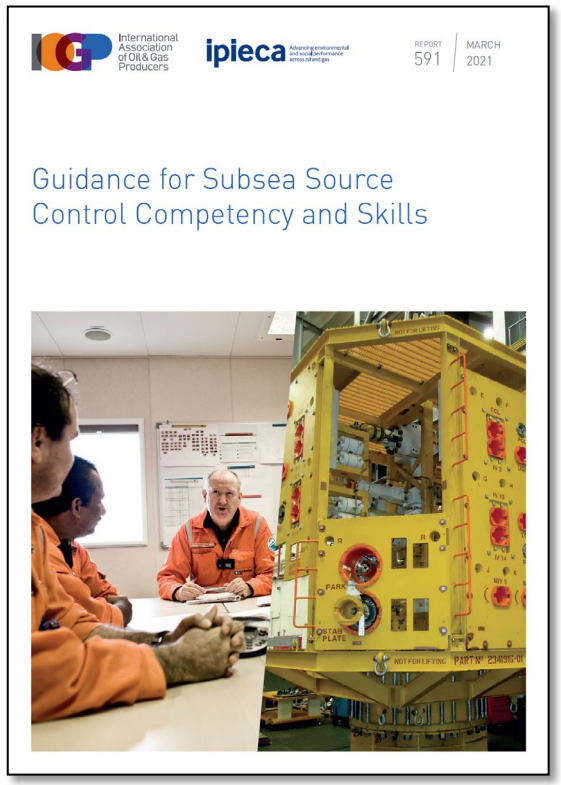
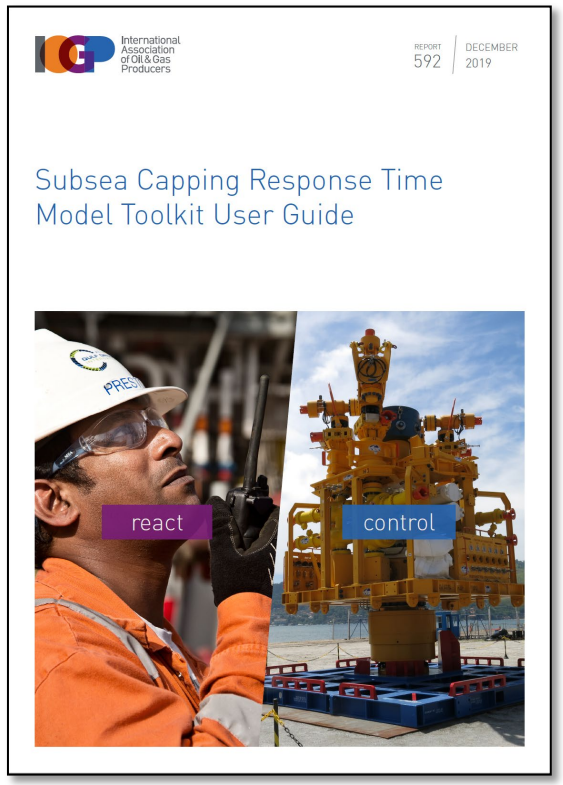
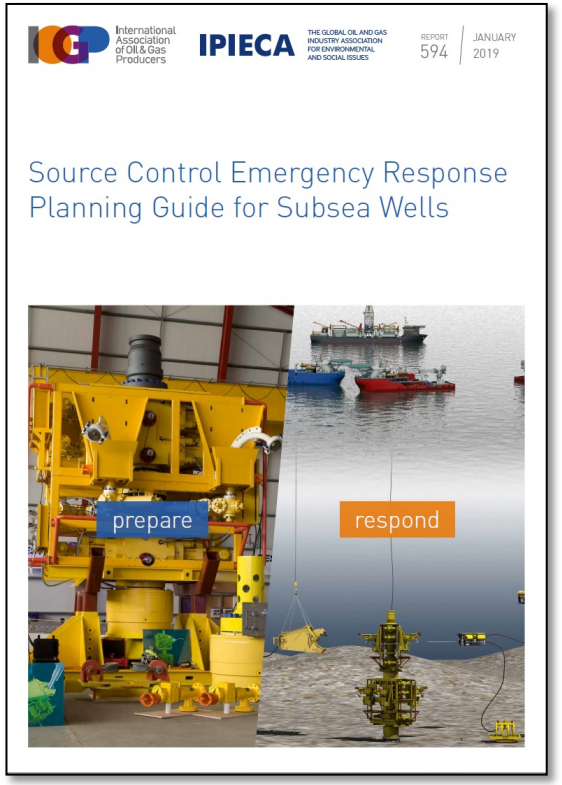
IOGP SWRSC

SWRSC Key Activities:

1. Creation of resources and best practices for industry.
2. Education and knowledge sharing
3. Stakeholder engagement
4. Technical projects and continuous improvement







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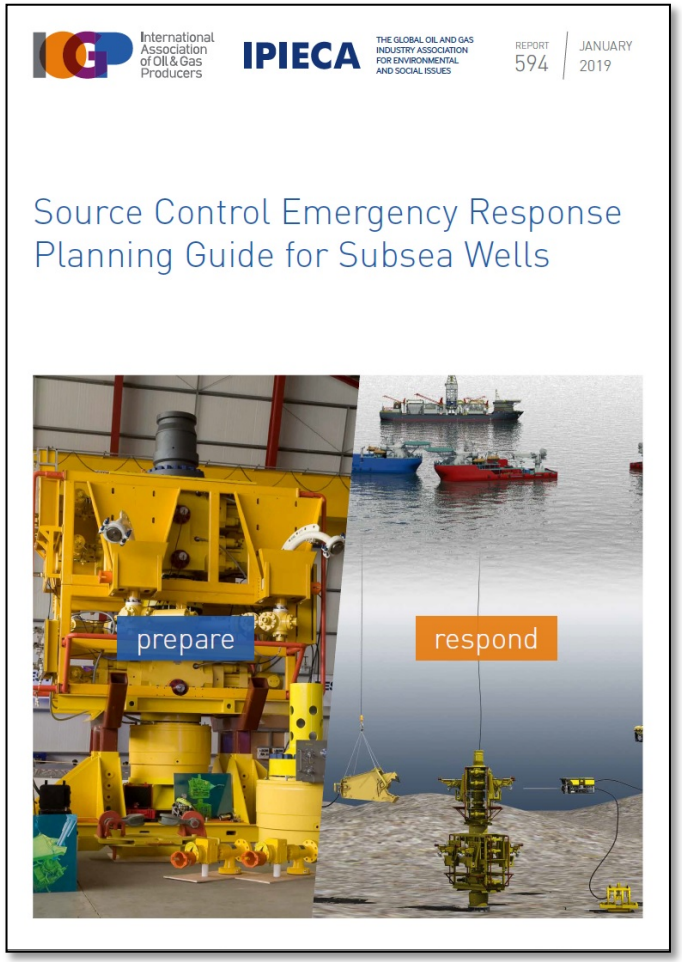
IOGP Report 594

Purpose

- Fills an industry knowledge gap where a vast amount of information has been accrued but not concisely disseminated to the wider industry.
- Intended to inform technical and non-technical stakeholders what is meant by subsea source control and present a holistic picture of what is involved.
- Provides an overview of technical activities that should be considered when designing wells and preparing a source control emergency response plan (SCERP).
- Establishes a common workflow and guidelines for industry participants.



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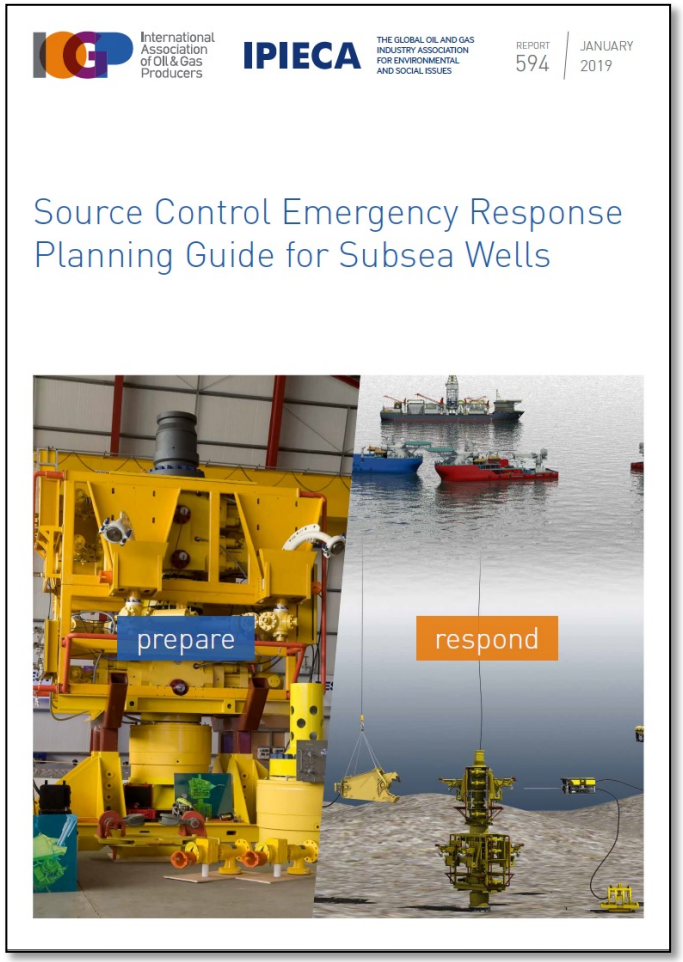
IOGP Report 594

- **Foreword**
  – Introduces the report and describes the difference between Capping and Containment.
- **Part 1: Overview of Source Control Emergency Response**
  – Describes response organisational structures and key task groups.
- **Part 2: Engineering Activities to Support Response Planning**
  – Goes into engineering, design and preparation activities that should be considered before drilling commences.
- **Part 3: Capping Stack Planning and Installation**
  – Discusses how to choose and deploy the right capping stack solution.
- **Part 4: Logistics Planning**
  – Considers mobilisation and logistic requirements.
- **Appendix:**
  - Overview of Containment.
  - Response task group detailed descriptions.
  - Capping stack resources available to industry.
  - An overview of the capping stack installation process.
  - Example drawings.
  - Response Plan checklists.



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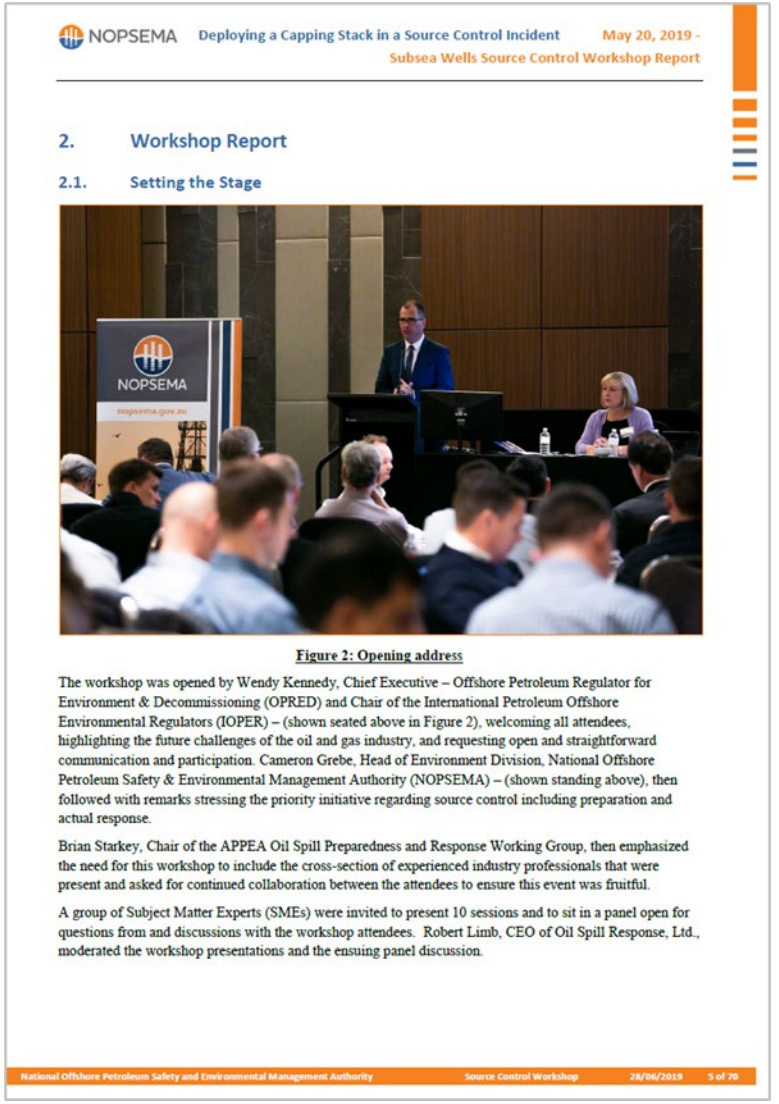
International Offshore Petroleum Environmental Regulators (IOPER)

- International environmental regulators working together to foster good practice.
- IOPER's Oil Spill Working Group recognised the need to further improve preparedness for timely source control response.
- NOPSEMA/(IOPER) with APPEA hosted the 'Source Control Workshop' at 2019 Spillcon in Australia to foster collaboration and consistency in source control planning.
- Industry's global subsea well response expertise supported the event to focus on subsea response planning to minimize response time – (IOGP presented Report 594).
- One objective was to use the workshop outputs to create a source control response-time-model project planning tool.



NOPSEMA Deploying a Capping Stack in a Source Control Incident May 20, 2019 - Subsea Wells Source Control Workshop Report

2. Workshop Report

2.1. Setting the Stage

Figure 2: Opening address

The workshop was opened by Wendy Kennedy, Chief Executive – Offshore Petroleum Regulator for Environment & Decommissioning (OPRED) and Chair of the International Petroleum Offshore Environmental Regulators (IOPER) – (shown seated above in Figure 2), welcoming all attendees, highlighting the future challenges of the oil and gas industry, and requesting open and straightforward communication and participation. Cameron Grebe, Head of Environment Division, National Offshore Petroleum Safety & Environmental Management Authority (NOPSEMA) – (shown standing above), then followed with remarks stressing the priority initiative regarding source control including preparation and actual response.

Brian Starkey, Chair of the APPEA Oil Spill Preparedness and Response Working Group, then emphasized the need for this workshop to include the cross-section of experienced industry professionals that were present and asked for continued collaboration between the attendees to ensure this event was fruitful.

A group of Subject Matter Experts (SMEs) were invited to present 10 sessions and to sit in a panel open for questions from and discussions with the workshop attendees. Robert Limb, CEO of Oil Spill Response, Ltd., moderated the workshop presentations and the ensuing panel discussion.

National Offshore Petroleum Safety and Environmental Management Authority Source Control Workshop 28/06/2019 5 of 70

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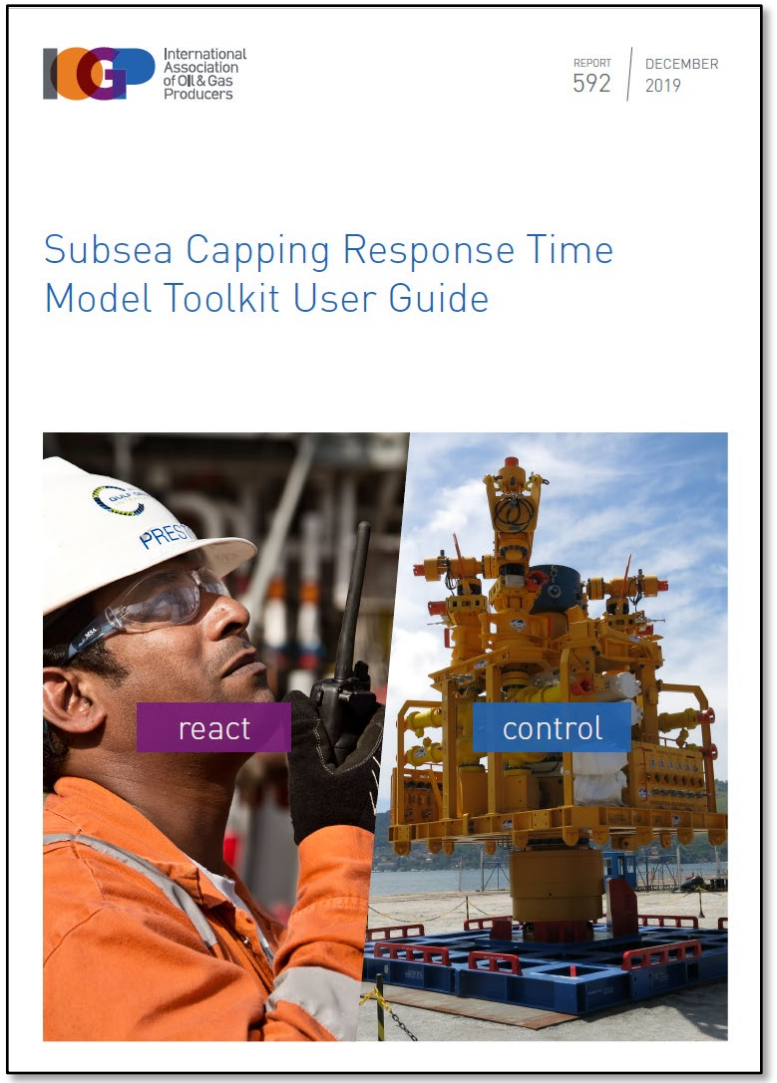
Report 592

- Developed in partnership with IOPER via NOPSEMA.
  - Steps taken to avoid regulatory capture such as no timelines entered, dynamic tool to be improved by users over time, etc.

- The report consists of subsea well response project files (multiple formats).
- Contains information on:
  1. User guide for how to use the model.
  2. Guidance on appropriate level of detail to be observed.
  3. Explanation of model logic with predecessor and successor activities.
  4. Color codes.

Does not:

1. Pre-populate response times.
2. Provide guidance on what times should be populated.
3. Consider Containment operations.



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Response Time Model & Report 592

- Report 594 describes the elements that form a SCERP.
- Response time models form part of the response plan, but have not been presented consistently to the same level of detail.
- IOGP next step: develop an RTM and use it as a tool to understand overall response time and critical path activities.
- Once the RTM is developed, it along with the SCERP can be validated with tabletop exercises.

The Project

- Recognising IOGP-IOPER synergies for source control response planning improvements, NOPSEMA and IOGP collaborated to produce the Response-Time-Model and Report 592.
- The RTM is a tool to improve our industry:
  - Consistency in plans which can make mutual aid easier to optimize – industry plug and play.
  - Allows Regulators to have a standard template to review and understand the status of best practice and whether Operators are appropriately reducing risk to ALARP (identifying and improving critical path items).
  - Makes overall planning more efficient through consistency.

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Response Time Model, Report 592

Level 1 shows the headline activities and is intended to present the overall summary

GANTT CHART

	Ta M	Task Name	Duration	Start	Finish	Predec	Successors	Resource Names	Ro	Lev 1	Le 2	Le 3	Justification for Time Estimates
1		**Response Planning Activities, SCERP Preparation**	0 hrs	Sun 10/20/19	Sun 10/20/19				Yes	Yes	Yes	Yes	
97		**Incident Occurs**	0 hrs	Sun 10/20/19	Sun 10/20/19		6,5,7,12,13,1		Yes	Yes	Yes	Yes	
98		**RESPONSE - notifications, activations and mobilizations**	0 hrs	Sun 10/20/19	Sun 10/20/19				Yes	Yes	Yes	Yes	
99		Initial Notifications	0 hrs	Sun 10/20/19	Sun 10/20/19				Yes	Yes	Yes	Yes	
105		Mobilization of Company Internal Resources	0 hrs	Sun 10/20/19	Sun 10/20/19				Yes	Yes	Yes	Yes	
154		Activation of External Resource Contracts	0 hrs	Sun 10/20/19	Sun 10/20/19				Yes	Yes	Yes	Yes	
258		Mobilization of Aircraft, Crane and Road Transport for Subsea Response Equipment Packages and Subsea Dispersant supplies, not including the capping stack	0 hrs	Sun 10/20/19	Sun 10/20/19				Yes	Yes	Yes	Yes	
304		Mobilization of Subsea Equipment Packages, except capping stack, to Offshore Operations Deployment Site for Subsea Missions	0 hrs	Sun 10/20/19	Sun 10/20/19				Yes	Yes	Yes	Yes	
355		Mobilization of Sea Vessels for Subsea Missions, except for capping stack	0 hrs	Sun 10/20/19	Sun 10/20/19				Yes	Yes	Yes	Yes	
443		Offshore / Subsea Well Incident Response Missions	0 hrs	Sun 10/20/19	Sun 10/20/19				Yes	Yes	Yes	Yes	
477		Capping Stack - Transport by Sea Vessel to Offshore Operations Deployment Site	0 hrs	Sun 10/20/19	Sun 10/20/19				Yes	Yes	Yes	Yes	
512		Capping Stack - Transport by Aircraft to Offshore Operations Deployment Site	0 hrs	Sun 10/20/19	Sun 10/20/19				Yes	Yes	Yes	Yes	
617		Capping Stack - Installation by Offset Installation Equipment (OIE) - Offset Installation System (OIS)	0 hrs	Sun 10/20/19	Sun 10/20/19				Yes	Yes	Yes	Yes	
776		Mobilization of Installation Vessels required for OIE Capping Stack Installation	0 hrs	Sun 10/20/19	Sun 10/20/19				Yes	Yes	Yes	Yes	
777		Anchor Handling Vessel (AHV) for OIS Deployment and Carrier Operations - Two required	0 hrs	Sun 10/20/19	Sun 10/20/19				Yes	Yes	No	Yes	
792		Supply Vessel for OIE Deployment - One required	0 hrs	Sun 10/20/19	Sun 10/20/19				Yes	Yes	No	Yes	
807		Offshore Construction Vessel (OCV) for OIS Carrier Deployment - One required	0 hrs	Sun 10/20/19	Sun 10/20/19				Yes	Yes	No	Yes	
822		Air Supply Vessel for OIS Deployment and Carrier Operations - One required, but may combined with other vessels	0 hrs	Sun 10/20/19	Sun 10/20/19				Yes	Yes	No	Yes	
837		Towing Vessel for OIS Carrier Deployment - One required	0 hrs	Sun 10/20/19	Sun 10/20/19				Yes	Yes	No	Yes	
909		Relief Well / Well Kill Operations	0 hrs	Sun 10/20/19	Sun 10/20/19				Yes	Yes	Yes	Yes	
911		RWD MODU is selected, notified and suspends any active operations	0 hrs	Sun 10/20/19	Sun 10/20/19	85,35,7	912,917		No	Yes	No	No	

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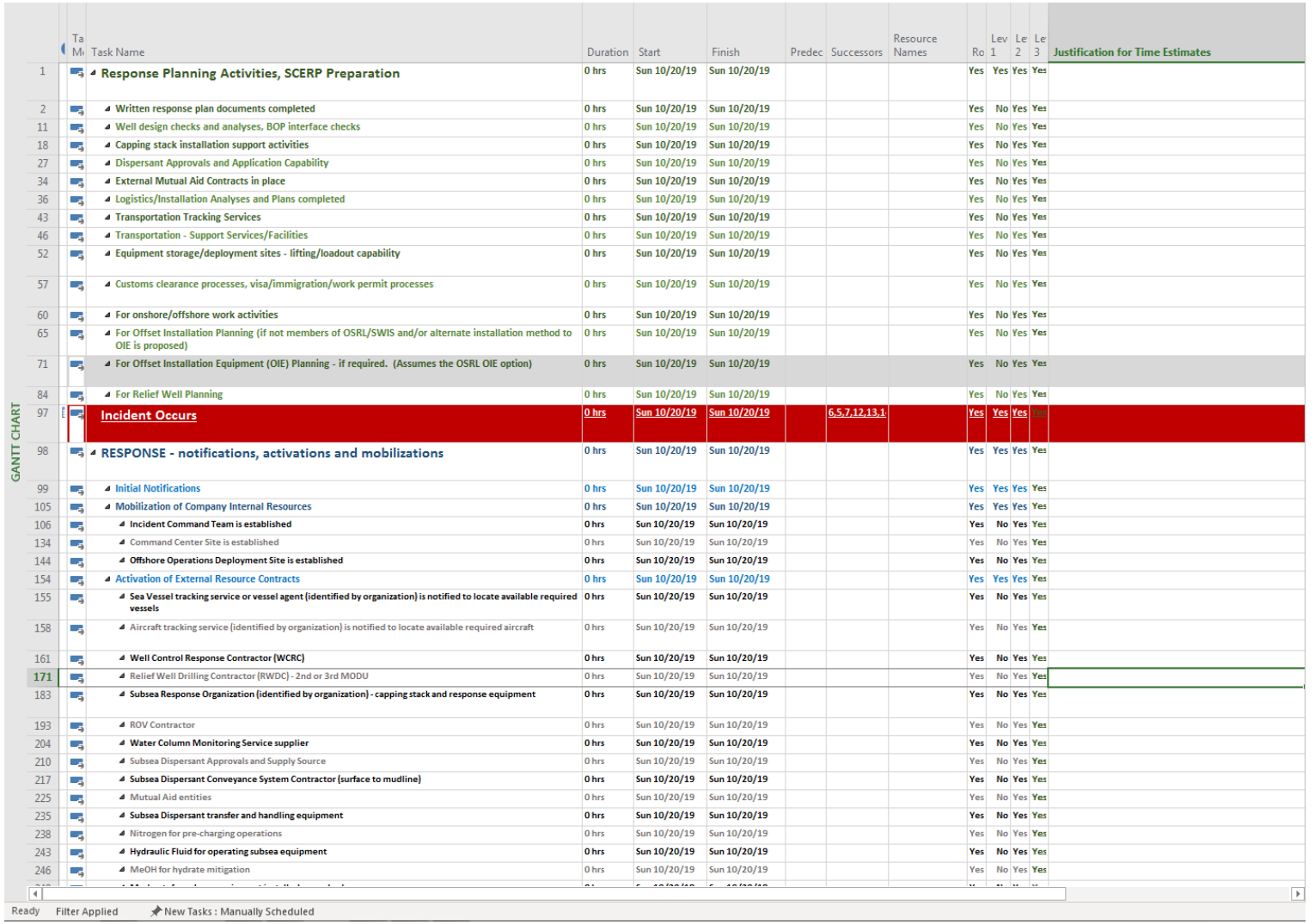
Response Time Model, Report 592

Level 2 contains the intermediate details.

It is anticipated that most level 2 activities can be populated when developing the response time forecast and used during tabletop exercises.



	Ta Mo	Task Name	Duration	Start	Finish	Predec	Successors	Resource Names	Ro	Lev 1	Le 2	Le 3	Justification for Time Estimates
1		Response Planning Activities, SCERP Preparation	0 hrs	Sun 10/20/19	Sun 10/20/19				Yes	Yes	Yes	Yes	
2		Written response plan documents completed	0 hrs	Sun 10/20/19	Sun 10/20/19				Yes	No	Yes	Yes	
11		Well design checks and analyses, BOP interface checks	0 hrs	Sun 10/20/19	Sun 10/20/19				Yes	No	Yes	Yes	
18		Capping stack installation support activities	0 hrs	Sun 10/20/19	Sun 10/20/19				Yes	No	Yes	Yes	
27		Dispersant Approvals and Application Capability	0 hrs	Sun 10/20/19	Sun 10/20/19				Yes	No	Yes	Yes	
34		External Mutual Aid Contracts in place	0 hrs	Sun 10/20/19	Sun 10/20/19				Yes	No	Yes	Yes	
36		Logistics/Installation Analyses and Plans completed	0 hrs	Sun 10/20/19	Sun 10/20/19				Yes	No	Yes	Yes	
43		Transportation Tracking Services	0 hrs	Sun 10/20/19	Sun 10/20/19				Yes	No	Yes	Yes	
46		Transportation - Support Services/Facilities	0 hrs	Sun 10/20/19	Sun 10/20/19				Yes	No	Yes	Yes	
52		Equipment storage/deployment sites - lifting/loadout capability	0 hrs	Sun 10/20/19	Sun 10/20/19				Yes	No	Yes	Yes	
57		Customs clearance processes, visa/immigration/work permit processes	0 hrs	Sun 10/20/19	Sun 10/20/19				Yes	No	Yes	Yes	
60		For onshore/offshore work activities	0 hrs	Sun 10/20/19	Sun 10/20/19				Yes	No	Yes	Yes	
65		For Offset Installation Planning (if not members of OSRL/SWIS and/or alternate installation method to OIE is proposed)	0 hrs	Sun 10/20/19	Sun 10/20/19				Yes	No	Yes	Yes	
71		For Offset Installation Equipment (OIE) Planning - if required. (Assumes the OSRL OIE option)	0 hrs	Sun 10/20/19	Sun 10/20/19				Yes	No	Yes	Yes	
84		For Relief Well Planning	0 hrs	Sun 10/20/19	Sun 10/20/19				Yes	No	Yes	Yes	
97		Incident Occurs	0 hrs	Sun 10/20/19	Sun 10/20/19		6,5,7,12,13,1		Yes	Yes	Yes	Yes	
98		RESPONSE - notifications, activations and mobilizations	0 hrs	Sun 10/20/19	Sun 10/20/19				Yes	Yes	Yes	Yes	
99		Initial Notifications	0 hrs	Sun 10/20/19	Sun 10/20/19				Yes	Yes	Yes	Yes	
105		Mobilization of Company Internal Resources	0 hrs	Sun 10/20/19	Sun 10/20/19				Yes	Yes	Yes	Yes	
106		Incident Command Team is established	0 hrs	Sun 10/20/19	Sun 10/20/19				Yes	No	Yes	Yes	
134		Command Center Site is established	0 hrs	Sun 10/20/19	Sun 10/20/19				Yes	No	Yes	Yes	
144		Offshore Operations Deployment Site is established	0 hrs	Sun 10/20/19	Sun 10/20/19				Yes	No	Yes	Yes	
154		Activation of External Resource Contracts	0 hrs	Sun 10/20/19	Sun 10/20/19				Yes	Yes	Yes	Yes	
155		Sea Vessel tracking service or vessel agent (identified by organization) is notified to locate available required vessels	0 hrs	Sun 10/20/19	Sun 10/20/19				Yes	No	Yes	Yes	
158		Aircraft tracking service (identified by organization) is notified to locate available required aircraft	0 hrs	Sun 10/20/19	Sun 10/20/19				Yes	No	Yes	Yes	
161		Well Control Response Contractor (WCRC)	0 hrs	Sun 10/20/19	Sun 10/20/19				Yes	No	Yes	Yes	
171		Relief Well Drilling Contractor (RWDC) - 2nd or 3rd MODU	0 hrs	Sun 10/20/19	Sun 10/20/19				Yes	No	Yes	Yes	
183		Subsea Response Organization (identified by organization) - capping stack and response equipment	0 hrs	Sun 10/20/19	Sun 10/20/19				Yes	No	Yes	Yes	
193		ROV Contractor	0 hrs	Sun 10/20/19	Sun 10/20/19				Yes	No	Yes	Yes	
204		Water Column Monitoring Service supplier	0 hrs	Sun 10/20/19	Sun 10/20/19				Yes	No	Yes	Yes	
210		Subsea Dispersant Approvals and Supply Source	0 hrs	Sun 10/20/19	Sun 10/20/19				Yes	No	Yes	Yes	
217		Subsea Dispersant Conveyance System Contractor (surface to mudline)	0 hrs	Sun 10/20/19	Sun 10/20/19				Yes	No	Yes	Yes	
225		Mutual Aid entities	0 hrs	Sun 10/20/19	Sun 10/20/19				Yes	No	Yes	Yes	
235		Subsea Dispersant transfer and handling equipment	0 hrs	Sun 10/20/19	Sun 10/20/19				Yes	No	Yes	Yes	
238		Nitrogen for pre-charging operations	0 hrs	Sun 10/20/19	Sun 10/20/19				Yes	No	Yes	Yes	
243		Hydraulic Fluid for operating subsea equipment	0 hrs	Sun 10/20/19	Sun 10/20/19				Yes	No	Yes	Yes	
246		MeOH for hydrate mitigation	0 hrs	Sun 10/20/19	Sun 10/20/19				Yes	No	Yes	Yes	

GANTT CHART

Ready Filter Applied New Tasks : Manually Scheduled

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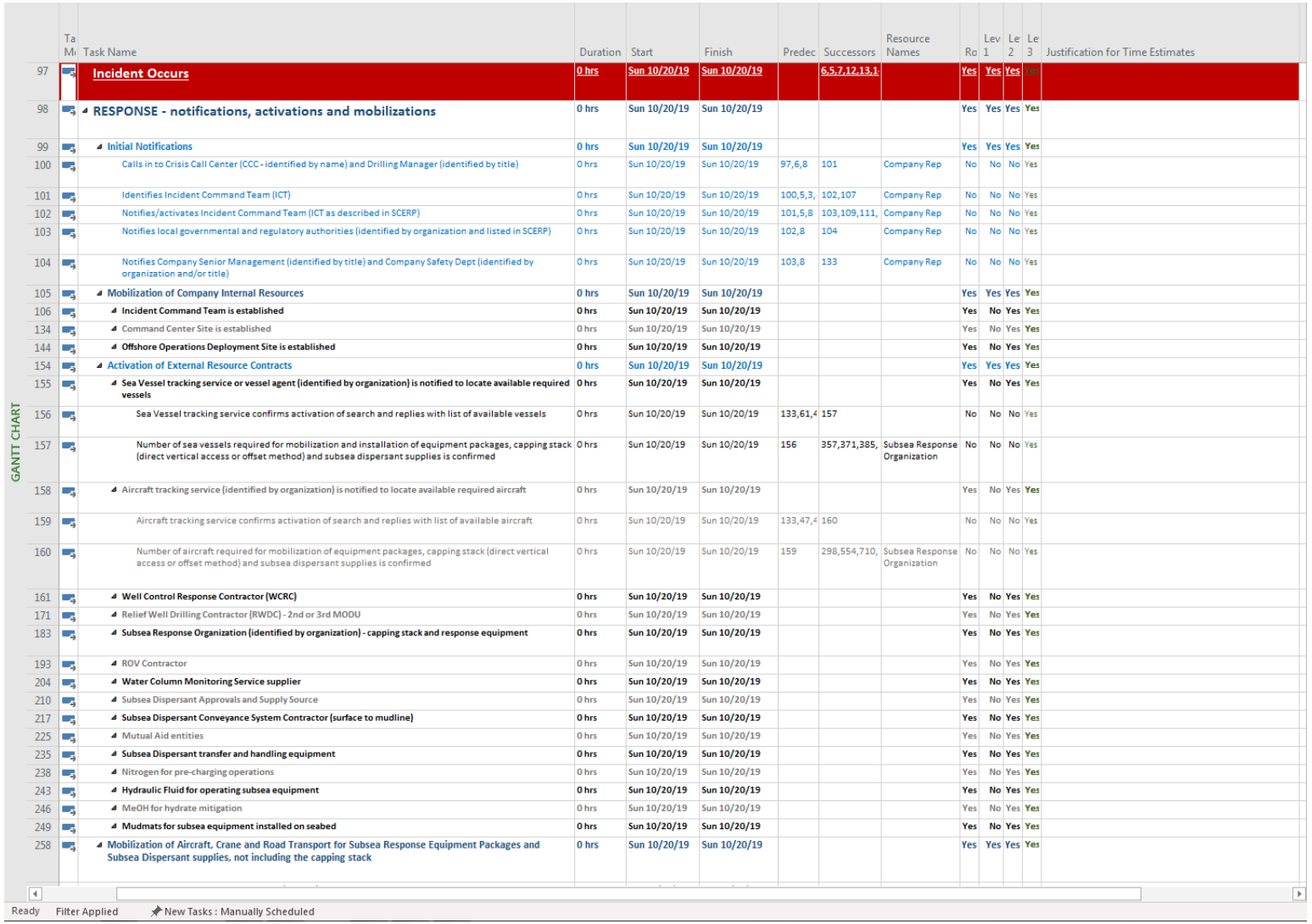
Response Time Model, Report 592

Level 3 contains the granular details.

Too detailed for supporting planning. Is intended to support an actual response.

Notwithstanding, Level 3 is worth reviewing as some activities can potentially have a significant impact on response time.



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	Ta Mi	Task Name	Duration	Start	Finish	Predec	Successors	Resource Names	Ro	Lev 1	Le 2	Le 3	Justification for Time Estimates
97		**Incident Occurs**	0 hrs	Sun 10/20/19	Sun 10/20/19		6,5,7,12,13,1		Yes	Yes	Yes	Yes	
98		**RESPONSE - notifications, activations and mobilizations**	0 hrs	Sun 10/20/19	Sun 10/20/19				Yes	Yes	Yes	Yes	
99		Initial Notifications	0 hrs	Sun 10/20/19	Sun 10/20/19				Yes	Yes	Yes	Yes	
100		Calls in to Crisis Call Center (CCC - identified by name) and Drilling Manager (identified by title)	0 hrs	Sun 10/20/19	Sun 10/20/19	97,6,8	101	Company Rep	No	No	No	Yes	
101		Identifies Incident Command Team (ICT)	0 hrs	Sun 10/20/19	Sun 10/20/19	100,5,3,	102,107	Company Rep	No	No	No	Yes	
102		Notifies/activates Incident Command Team (ICT as described in SCERP)	0 hrs	Sun 10/20/19	Sun 10/20/19	101,5,8	103,109,111,	Company Rep	No	No	No	Yes	
103		Notifies local governmental and regulatory authorities (identified by organization and listed in SCERP)	0 hrs	Sun 10/20/19	Sun 10/20/19	102,8	104	Company Rep	No	No	No	Yes	
104		Notifies Company Senior Management (identified by title) and Company Safety Dept (identified by organization and/or title)	0 hrs	Sun 10/20/19	Sun 10/20/19	103,8	133	Company Rep	No	No	No	Yes	
105		Mobilization of Company Internal Resources	0 hrs	Sun 10/20/19	Sun 10/20/19				Yes	Yes	Yes	Yes	
106		**Incident Command Team is established**	0 hrs	Sun 10/20/19	Sun 10/20/19				Yes	No	Yes	Yes	
134		Command Center Site is established	0 hrs	Sun 10/20/19	Sun 10/20/19				Yes	No	Yes	Yes	
144		**Offshore Operations Deployment Site is established**	0 hrs	Sun 10/20/19	Sun 10/20/19				Yes	No	Yes	Yes	
154		Activation of External Resource Contracts	0 hrs	Sun 10/20/19	Sun 10/20/19				Yes	Yes	Yes	Yes	
155		**Sea Vessel tracking service or vessel agent (identified by organization) is notified to locate available required vessels**	0 hrs	Sun 10/20/19	Sun 10/20/19				Yes	No	Yes	Yes	
156		Sea Vessel tracking service confirms activation of search and replies with list of available vessels	0 hrs	Sun 10/20/19	Sun 10/20/19	133,61,4	157		No	No	No	Yes	
157		Number of sea vessels required for mobilization and installation of equipment packages, capping stack (direct vertical access or offset method) and subsea dispersant supplies is confirmed	0 hrs	Sun 10/20/19	Sun 10/20/19	156	357,371,385,	Subsea Response Organization	No	No	No	Yes	
158		Aircraft tracking service (identified by organization) is notified to locate available required aircraft	0 hrs	Sun 10/20/19	Sun 10/20/19				Yes	No	Yes	Yes	
159		Aircraft tracking service confirms activation of search and replies with list of available aircraft	0 hrs	Sun 10/20/19	Sun 10/20/19	133,47,4	160		No	No	No	Yes	
160		Number of aircraft required for mobilization of equipment packages, capping stack (direct vertical access or offset method) and subsea dispersant supplies is confirmed	0 hrs	Sun 10/20/19	Sun 10/20/19	159	298,554,710,	Subsea Response Organization	No	No	No	Yes	
161		**Well Control Response Contractor (WCRC)**	0 hrs	Sun 10/20/19	Sun 10/20/19				Yes	No	Yes	Yes	
171		Relief Well Drilling Contractor (RWDC) - 2nd or 3rd MODU	0 hrs	Sun 10/20/19	Sun 10/20/19				Yes	No	Yes	Yes	
183		**Subsea Response Organization (identified by organization) - capping stack and response equipment**	0 hrs	Sun 10/20/19	Sun 10/20/19				Yes	No	Yes	Yes	
193		ROV Contractor	0 hrs	Sun 10/20/19	Sun 10/20/19				Yes	No	Yes	Yes	
204		**Water Column Monitoring Service supplier**	0 hrs	Sun 10/20/19	Sun 10/20/19				Yes	No	Yes	Yes	
210		Subsea Dispersant Approvals and Supply Source	0 hrs	Sun 10/20/19	Sun 10/20/19				Yes	No	Yes	Yes	
217		**Subsea Dispersant Conveyance System Contractor (surface to mudline)**	0 hrs	Sun 10/20/19	Sun 10/20/19				Yes	No	Yes	Yes	
225		Mutual Aid entities	0 hrs	Sun 10/20/19	Sun 10/20/19				Yes	No	Yes	Yes	
235		**Subsea Dispersant transfer and handling equipment**	0 hrs	Sun 10/20/19	Sun 10/20/19				Yes	No	Yes	Yes	
238		Nitrogen for pre-charging operations	0 hrs	Sun 10/20/19	Sun 10/20/19				Yes	No	Yes	Yes	
243		**Hydraulic Fluid for operating subsea equipment**	0 hrs	Sun 10/20/19	Sun 10/20/19				Yes	No	Yes	Yes	
246		MeOH for hydrate mitigation	0 hrs	Sun 10/20/19	Sun 10/20/19				Yes	No	Yes	Yes	
249		**Mudmats for subsea equipment installed on seabed**	0 hrs	Sun 10/20/19	Sun 10/20/19				Yes	No	Yes	Yes	
258		Mobilization of Aircraft, Crane and Road Transport for Subsea Response Equipment Packages and Subsea Dispersant supplies, not including the capping stack	0 hrs	Sun 10/20/19	Sun 10/20/19				Yes	Yes	Yes	Yes	

Ready | Filter Applied | New Tasks : Manually Scheduled

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Response Time Model, Report 592

Green's – Planning and pre-response activities, Level 1 and 2 roll ups and activities.

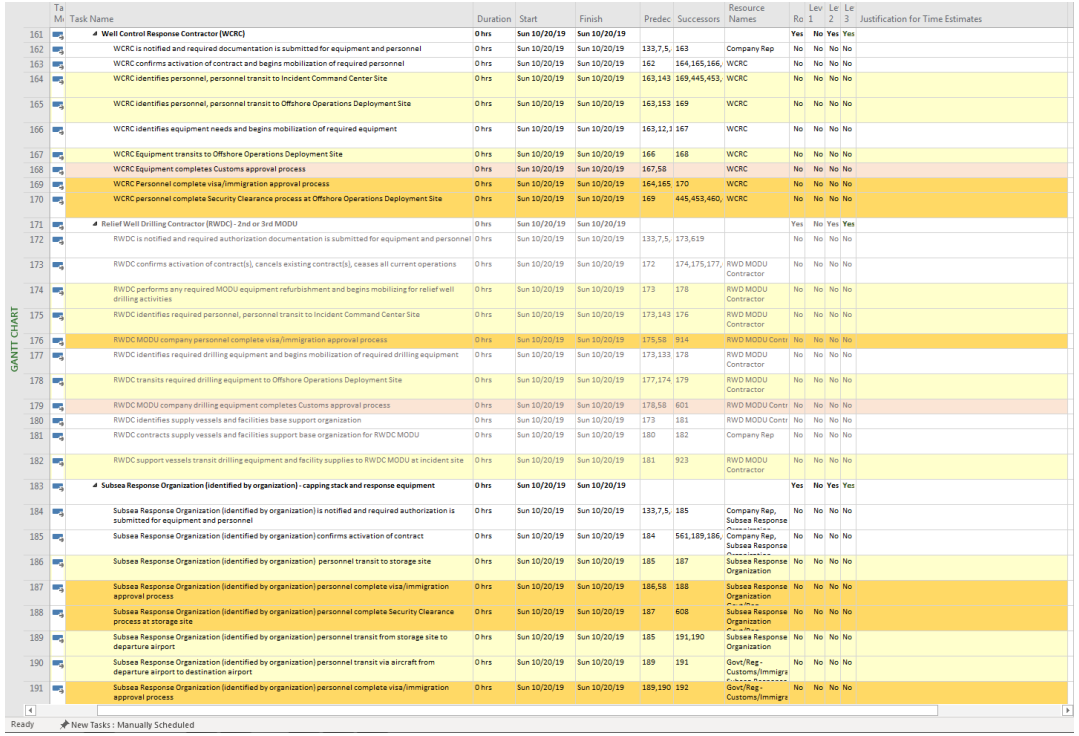
White on Red – Incident time datum.

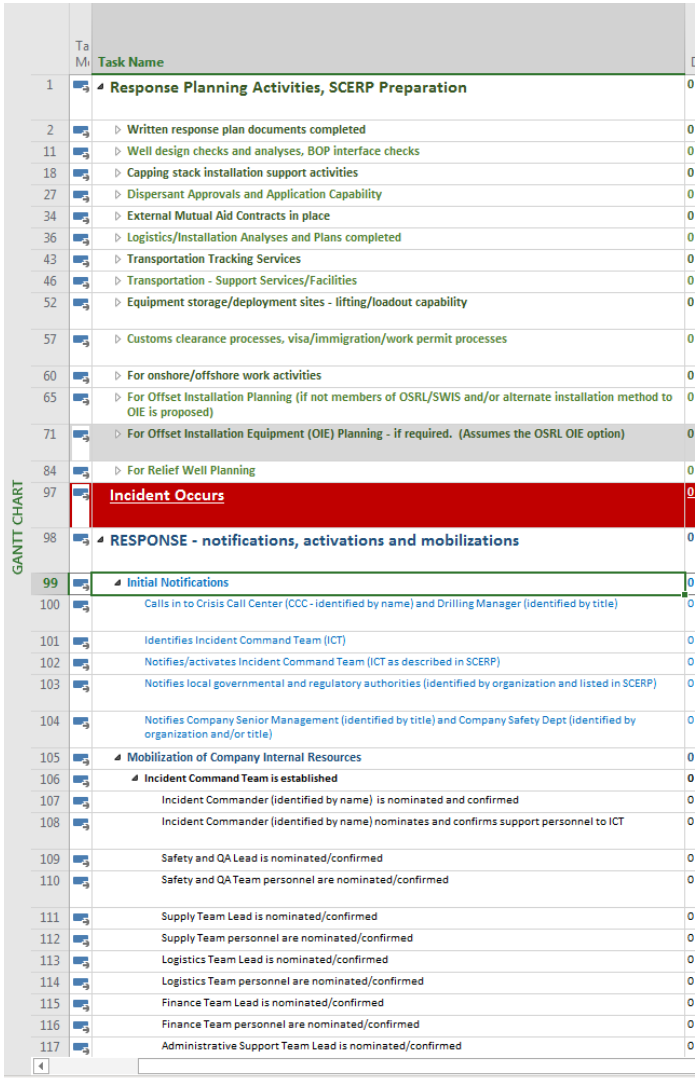
Blue's – Response activities, Level 1 and 2 roll ups and activities.

Black & Grey – Level 3 roll ups and activities.

Yellow shading – Logistical movement activity.

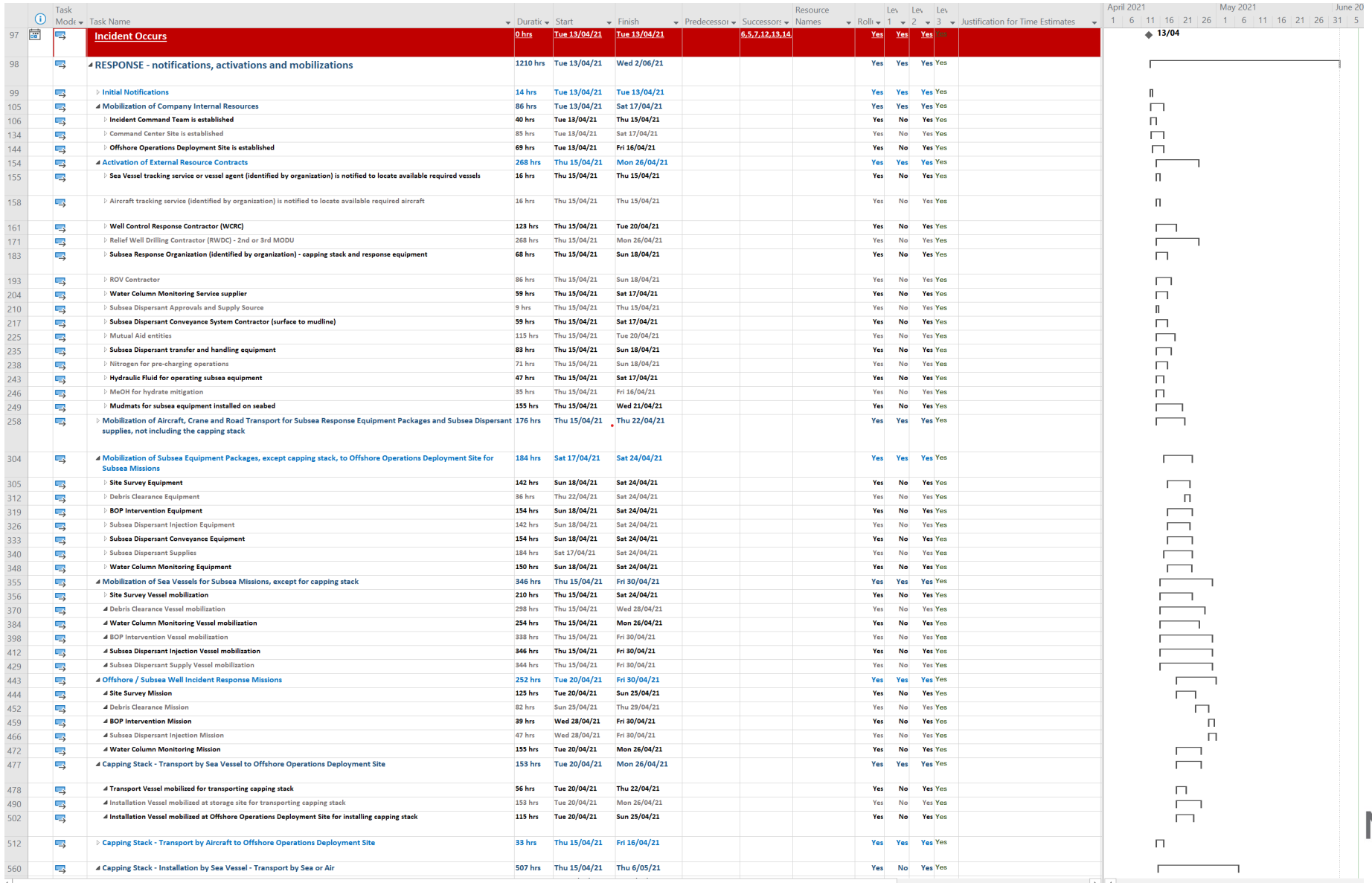
Peach & Orange shading – Linked to governmental approvals or processes.





Example of RTM use

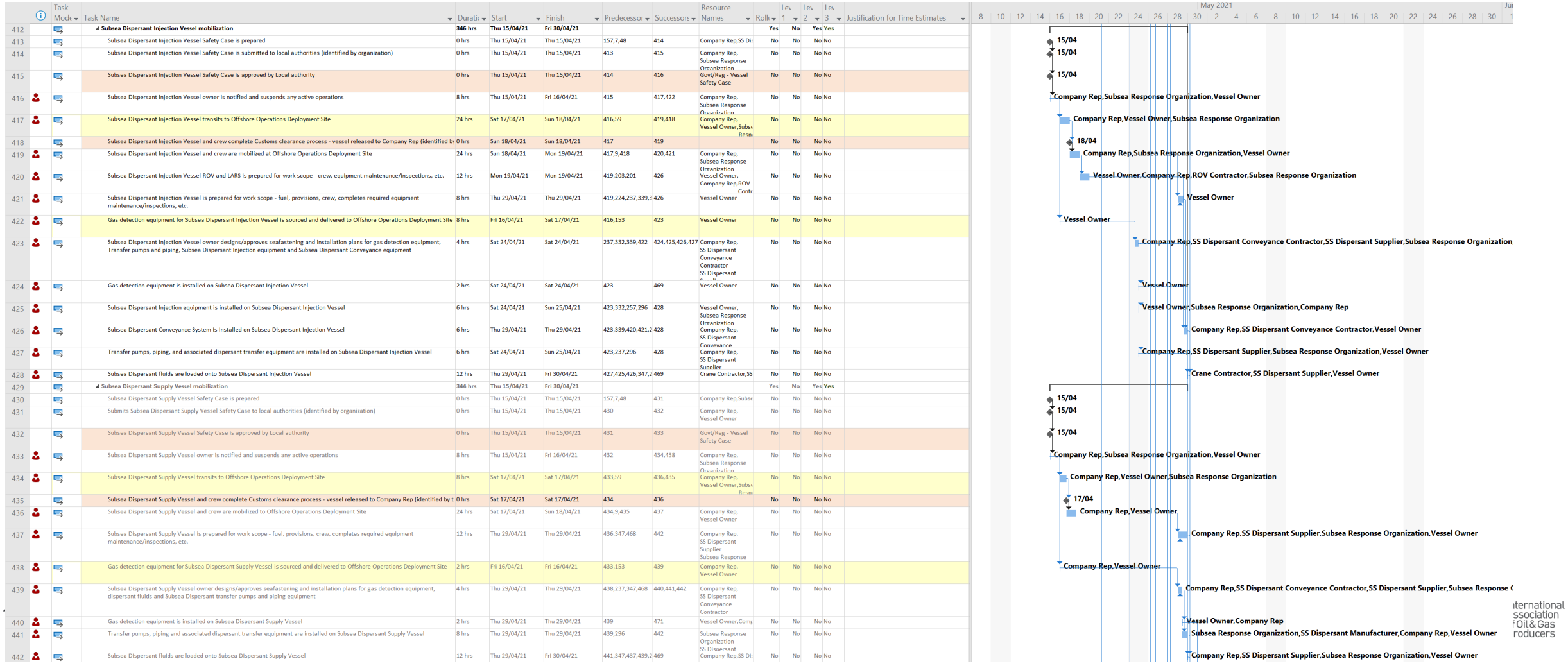
Populate the RTM with estimated durations, complete with ‘Justifications for Time Estimates’



	Task Mode	Task Name	Duration	Start	Finish	Predecessors	Successors	Resource Names	Rollup	Level 1	Level 2	Level 3	Justification for Time Estimates
97		**Incident Occurs**	0 hrs	Tue 13/04/21	Tue 13/04/21		6,5,7,12,13,14		Yes	Yes	Yes	Yes	
98		RESPONSE - notifications, activations and mobilizations	1210 hrs	Tue 13/04/21	Wed 2/06/21				Yes	Yes	Yes	Yes	
99		Initial Notifications	14 hrs	Tue 13/04/21	Tue 13/04/21				Yes	Yes	Yes	Yes	
105		Mobilization of Company Internal Resources	86 hrs	Tue 13/04/21	Sat 17/04/21				Yes	Yes	Yes	Yes	
106		Incident Command Team is established	40 hrs	Tue 13/04/21	Thu 15/04/21				Yes	No	Yes	Yes	
134		Command Center Site is established	85 hrs	Tue 13/04/21	Sat 17/04/21				Yes	No	Yes	Yes	
144		Offshore Operations Deployment Site is established	69 hrs	Tue 13/04/21	Fri 16/04/21				Yes	No	Yes	Yes	
154		Activation of External Resource Contracts	268 hrs	Thu 15/04/21	Mon 26/04/21				Yes	Yes	Yes	Yes	
155		Sea Vessel tracking service or vessel agent (identified by organization) is notified to locate available required vessels	16 hrs	Thu 15/04/21	Thu 15/04/21				Yes	No	Yes	Yes	
158		Aircraft tracking service (identified by organization) is notified to locate available required aircraft	16 hrs	Thu 15/04/21	Thu 15/04/21				Yes	No	Yes	Yes	
161		Well Control Response Contractor (WCRC)	123 hrs	Thu 15/04/21	Tue 20/04/21				Yes	No	Yes	Yes	
171		Relief Well Drilling Contractor (RWDC) - 2nd or 3rd MODU	268 hrs	Thu 15/04/21	Mon 26/04/21				Yes	No	Yes	Yes	
183		Subsea Response Organization (identified by organization) - capping stack and response equipment	68 hrs	Thu 15/04/21	Sun 18/04/21				Yes	No	Yes	Yes	
193		ROV Contractor	86 hrs	Thu 15/04/21	Sun 18/04/21				Yes	No	Yes	Yes	
204		Water Column Monitoring Service supplier	59 hrs	Thu 15/04/21	Sat 17/04/21				Yes	No	Yes	Yes	
210		Subsea Dispersant Approvals and Supply Source	9 hrs	Thu 15/04/21	Thu 15/04/21				Yes	No	Yes	Yes	
217		Subsea Dispersant Conveyance System Contractor (surface to mudline)	59 hrs	Thu 15/04/21	Sat 17/04/21				Yes	No	Yes	Yes	
225		Mutual Aid entities	115 hrs	Thu 15/04/21	Tue 20/04/21				Yes	No	Yes	Yes	
235		Subsea Dispersant transfer and handling equipment	83 hrs	Thu 15/04/21	Sun 18/04/21				Yes	No	Yes	Yes	
238		Nitrogen for pre-charging operations	71 hrs	Thu 15/04/21	Sun 18/04/21				Yes	No	Yes	Yes	
243		Hydraulic Fluid for operating subsea equipment	47 hrs	Thu 15/04/21	Sat 17/04/21				Yes	No	Yes	Yes	
246		MeOH for hydrate mitigation	35 hrs	Thu 15/04/21	Fri 16/04/21				Yes	No	Yes	Yes	
249		Mudmats for subsea equipment installed on seabed	155 hrs	Thu 15/04/21	Wed 21/04/21				Yes	No	Yes	Yes	
258		Mobilization of Aircraft, Crane and Road Transport for Subsea Response Equipment Packages and Subsea Dispersant supplies, not including the capping stack	176 hrs	Thu 15/04/21	Thu 22/04/21				Yes	Yes	Yes	Yes	
304		Mobilization of Subsea Equipment Packages, except capping stack, to Offshore Operations Deployment Site for Subsea Missions	184 hrs	Sat 17/04/21	Sat 24/04/21				Yes	Yes	Yes	Yes	
305		Site Survey Equipment	142 hrs	Sun 18/04/21	Sat 24/04/21				Yes	No	Yes	Yes	
312		Debris Clearance Equipment	36 hrs	Thu 22/04/21	Sat 24/04/21				Yes	No	Yes	Yes	
319		BOP Intervention Equipment	154 hrs	Sun 18/04/21	Sat 24/04/21				Yes	No	Yes	Yes	
326		Subsea Dispersant Injection Equipment	142 hrs	Sun 18/04/21	Sat 24/04/21				Yes	No	Yes	Yes	
333		Subsea Dispersant Conveyance Equipment	154 hrs	Sun 18/04/21	Sat 24/04/21				Yes	No	Yes	Yes	
340		Subsea Dispersant Supplies	184 hrs	Sat 17/04/21	Sat 24/04/21				Yes	No	Yes	Yes	
348		Water Column Monitoring Equipment	150 hrs	Sun 18/04/21	Sat 24/04/21				Yes	No	Yes	Yes	
355		Mobilization of Sea Vessels for Subsea Missions, except for capping stack	346 hrs	Thu 15/04/21	Fri 30/04/21				Yes	Yes	Yes	Yes	
356		Site Survey Vessel mobilization	210 hrs	Thu 15/04/21	Sat 24/04/21				Yes	No	Yes	Yes	
370		Debris Clearance Vessel mobilization	298 hrs	Thu 15/04/21	Wed 28/04/21				Yes	No	Yes	Yes	
384		Water Column Monitoring Vessel mobilization	254 hrs	Thu 15/04/21	Mon 26/04/21				Yes	No	Yes	Yes	
398		BOP Intervention Vessel mobilization	338 hrs	Thu 15/04/21	Fri 30/04/21				Yes	No	Yes	Yes	
412		Subsea Dispersant Injection Vessel mobilization	346 hrs	Thu 15/04/21	Fri 30/04/21				Yes	No	Yes	Yes	
429		Subsea Dispersant Supply Vessel mobilization	344 hrs	Thu 15/04/21	Fri 30/04/21				Yes	No	Yes	Yes	
443		Offshore / Subsea Well Incident Response Missions	252 hrs	Tue 20/04/21	Fri 30/04/21				Yes	Yes	Yes	Yes	
444		Site Survey Mission	125 hrs	Tue 20/04/21	Sun 25/04/21				Yes	No	Yes	Yes	
452		Debris Clearance Mission	82 hrs	Sun 25/04/21	Thu 29/04/21				Yes	No	Yes	Yes	
459		BOP Intervention Mission	39 hrs	Wed 28/04/21	Fri 30/04/21				Yes	No	Yes	Yes	
466		Subsea Dispersant Injection Mission	47 hrs	Wed 28/04/21	Fri 30/04/21				Yes	No	Yes	Yes	
472		Water Column Monitoring Mission	155 hrs	Tue 20/04/21	Mon 26/04/21				Yes	No	Yes	Yes	
477		Capping Stack - Transport by Sea Vessel to Offshore Operations Deployment Site	153 hrs	Tue 20/04/21	Mon 26/04/21				Yes	Yes	Yes	Yes	
478		Transport Vessel mobilized for transporting capping stack	56 hrs	Tue 20/04/21	Thu 22/04/21				Yes	No	Yes	Yes	
490		Installation Vessel mobilized at storage site for transporting capping stack	153 hrs	Tue 20/04/21	Mon 26/04/21				Yes	No	Yes	Yes	
502		Installation Vessel mobilized at Offshore Operations Deployment Site for installing capping stack	115 hrs	Tue 20/04/21	Sun 25/04/21				Yes	No	Yes	Yes	
512		Capping Stack - Transport by Aircraft to Offshore Operations Deployment Site	33 hrs	Thu 15/04/21	Fri 16/04/21				Yes	Yes	Yes	Yes	
560		Capping Stack - Installation by Sea Vessel - Transport by Sea or Air	507 hrs	Thu 15/04/21	Thu 6/05/21				Yes	No	Yes	Yes	

Identify the critical path items

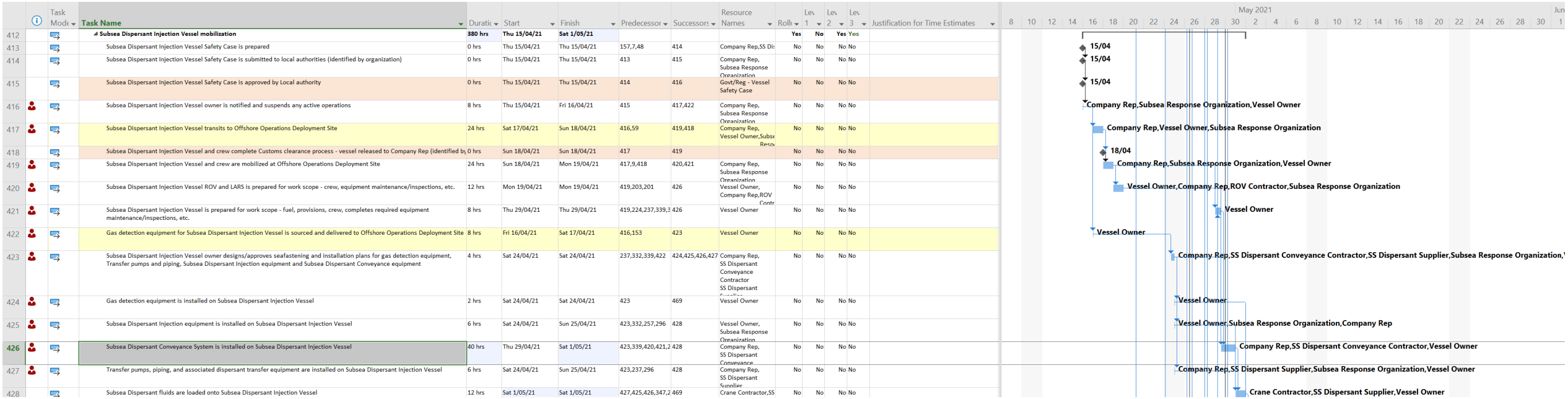
‘Predecessors’ and ‘Successors’ will identify the tasks that are critical e.g. task 426 requires dispersant conveyance system installed on injection vessel and needs to occur before task 428, which needs to occur before dispersant deployment task 469.



	Task Mode	Task Name	Duration	Start	Finish	Predecessors	Successors	Resource Names	Rollup	Level 1	Level 2	Level 3	Justification for Time Estimates
412		**Subsea Dispersant Injection Vessel mobilization**	**346 hrs**	**Thu 15/04/21**	**Fri 30/04/21**				Yes	No	Yes	Yes	
413		Subsea Dispersant Injection Vessel Safety Case is prepared	0 hrs	Thu 15/04/21	Thu 15/04/21	157,7,48	414	Company Rep,SS Dis	No	No	No	No	
414		Subsea Dispersant Injection Vessel Safety Case is submitted to local authorities (identified by organization)	0 hrs	Thu 15/04/21	Thu 15/04/21	413	415	Company Rep, Subsea Response Organization	No	No	No	No	
415		Subsea Dispersant Injection Vessel Safety Case is approved by Local authority	0 hrs	Thu 15/04/21	Thu 15/04/21	414	416	Govt/Reg - Vessel Safety Case	No	No	No	No	
416		Subsea Dispersant Injection Vessel owner is notified and suspends any active operations	8 hrs	Thu 15/04/21	Fri 16/04/21	415	417,422	Company Rep, Subsea Response Organization	No	No	No	No	
417		Subsea Dispersant Injection Vessel transits to Offshore Operations Deployment Site	24 hrs	Sat 17/04/21	Sun 18/04/21	416,59	419,418	Company Rep, Vessel Owner,Subse Respo	No	No	No	No	
418		Subsea Dispersant Injection Vessel and crew complete Customs clearance process - vessel released to Company Rep (identified by	0 hrs	Sun 18/04/21	Sun 18/04/21	417	419		No	No	No	No	
419		Subsea Dispersant Injection Vessel and crew are mobilized at Offshore Operations Deployment Site	24 hrs	Sun 18/04/21	Mon 19/04/21	417,9,418	420,421	Company Rep, Subsea Response Organization	No	No	No	No	
420		Subsea Dispersant Injection Vessel ROV and LARS is prepared for work scope - crew, equipment maintenance/inspections, etc.	12 hrs	Mon 19/04/21	Mon 19/04/21	419,203,201	426	Vessel Owner, Company Rep,ROV Contr	No	No	No	No	
421		Subsea Dispersant Injection Vessel is prepared for work scope - fuel, provisions, crew, completes required equipment maintenance/inspections, etc.	8 hrs	Thu 29/04/21	Thu 29/04/21	419,224,237,339,3	426	Vessel Owner	No	No	No	No	
422		Gas detection equipment for Subsea Dispersant Injection Vessel is sourced and delivered to Offshore Operations Deployment Site	8 hrs	Fri 16/04/21	Sat 17/04/21	416,153	423	Vessel Owner	No	No	No	No	
423		Subsea Dispersant Injection Vessel owner designs/approves seafastening and installation plans for gas detection equipment, Transfer pumps and piping, Subsea Dispersant Injection equipment and Subsea Dispersant Conveyance equipment	4 hrs	Sat 24/04/21	Sat 24/04/21	237,332,339,422	424,425,426,427	Company Rep, SS Dispersant Conveyance Contractor SS Dispersant	No	No	No	No	
424		Gas detection equipment is installed on Subsea Dispersant Injection Vessel	2 hrs	Sat 24/04/21	Sat 24/04/21	423	469	Vessel Owner	No	No	No	No	
425		Subsea Dispersant Injection equipment is installed on Subsea Dispersant Injection Vessel	6 hrs	Sat 24/04/21	Sun 25/04/21	423,332,257,296	428	Vessel Owner, Subsea Response Organization	No	No	No	No	
426		Subsea Dispersant Conveyance System is installed on Subsea Dispersant Injection Vessel	6 hrs	Thu 29/04/21	Thu 29/04/21	423,339,420,421,2	428	Company Rep, SS Dispersant Conveyance	No	No	No	No	
427		Transfer pumps, piping, and associated dispersant transfer equipment are installed on Subsea Dispersant Injection Vessel	6 hrs	Sat 24/04/21	Sun 25/04/21	423,237,296	428	Company Rep, SS Dispersant Supplier	No	No	No	No	
428		Subsea Dispersant fluids are loaded onto Subsea Dispersant Injection Vessel	12 hrs	Thu 29/04/21	Fri 30/04/21	427,425,426,347,2	469	Crane Contractor,SS	No	No	No	No	
429		**Subsea Dispersant Supply Vessel mobilization**	**344 hrs**	**Thu 15/04/21**	**Fri 30/04/21**				Yes	No	Yes	Yes	
430		Subsea Dispersant Supply Vessel Safety Case is prepared	0 hrs	Thu 15/04/21	Thu 15/04/21	157,7,48	431	Company Rep,Subse	No	No	No	No	
431		Submits Subsea Dispersant Supply Vessel Safety Case to local authorities (identified by organization)	0 hrs	Thu 15/04/21	Thu 15/04/21	430	432	Company Rep, Vessel Owner	No	No	No	No	
432		Subsea Dispersant Supply Vessel Safety Case is approved by Local authority	0 hrs	Thu 15/04/21	Thu 15/04/21	431	433	Govt/Reg - Vessel Safety Case	No	No	No	No	
433		Subsea Dispersant Supply Vessel owner is notified and suspends any active operations	8 hrs	Thu 15/04/21	Fri 16/04/21	432	434,438	Company Rep, Subsea Response Organization	No	No	No	No	
434		Subsea Dispersant Supply Vessel transits to Offshore Operations Deployment Site	8 hrs	Sat 17/04/21	Sat 17/04/21	433,59	436,435	Company Rep, Vessel Owner,Subse Respo	No	No	No	No	
435		Subsea Dispersant Supply Vessel and crew complete Customs clearance process - vessel released to Company Rep (identified by t	0 hrs	Sat 17/04/21	Sat 17/04/21	434	436		No	No	No	No	
436		Subsea Dispersant Supply Vessel and crew are mobilized to Offshore Operations Deployment Site	24 hrs	Sat 17/04/21	Sun 18/04/21	434,9,435	437	Company Rep, Vessel Owner	No	No	No	No	
437		Subsea Dispersant Supply Vessel is prepared for work scope - fuel, provisions, crew, completes required equipment maintenance/inspections, etc.	12 hrs	Thu 29/04/21	Thu 29/04/21	436,347,468	442	Company Rep, SS Dispersant Supplier Subsea Response	No	No	No	No	
438		Gas detection equipment for Subsea Dispersant Supply Vessel is sourced and delivered to Offshore Operations Deployment Site	2 hrs	Fri 16/04/21	Fri 16/04/21	433,153	439	Company Rep, Vessel Owner	No	No	No	No	
439		Subsea Dispersant Supply Vessel owner designs/approves seafastening and installation plans for gas detection equipment, dispersant fluids and Subsea Dispersant transfer pumps and piping equipment	4 hrs	Thu 29/04/21	Thu 29/04/21	438,237,347,468	440,441,442	Company Rep, SS Dispersant Conveyance Contractor	No	No	No	No	
440		Gas detection equipment is installed on Subsea Dispersant Supply Vessel	2 hrs	Thu 29/04/21	Thu 29/04/21	439	471	Vessel Owner,Comp	No	No	No	No	
441		Transfer pumps, piping and associated dispersant transfer equipment are installed on Subsea Dispersant Supply Vessel	8 hrs	Thu 29/04/21	Thu 29/04/21	439,296	442	Subsea Response Organization SS Dispersant	No	No	No	No	
442		Subsea Dispersant fluids are loaded onto Subsea Dispersant Supply Vessel	12 hrs	Thu 29/04/21	Fri 30/04/21	441,347,437,439,2	469	Company Rep,SS Dis	No	No	No	No	

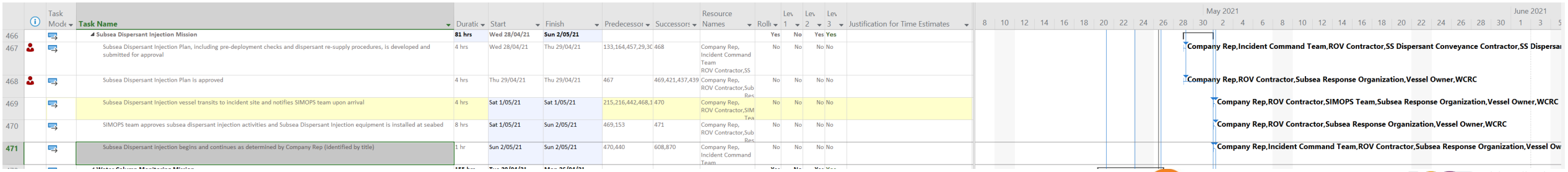
Improve the timelines of critical path items

Could time increase due to not prepared with downline dispersant conveyance system?



	Task Mode	Task Name	Duration	Start	Finish	Predecessors	Successors	Resource Names	Rollup	Level 1	Level 2	Level 3	Justification for Time Estimates
412		**Subsea Dispersant Injection Vessel mobilization**	**380 hrs**	**Thu 15/04/21**	**Sat 1/05/21**				**Yes**	**No**	**Yes**	**Yes**	
413		Subsea Dispersant Injection Vessel Safety Case is prepared	0 hrs	Thu 15/04/21	Thu 15/04/21	157,7,48	414	Company Rep,SS Di	No	No	No	No	
414		Subsea Dispersant Injection Vessel Safety Case is submitted to local authorities (identified by organization)	0 hrs	Thu 15/04/21	Thu 15/04/21	413	415	Company Rep, Subsea Response Organization	No	No	No	No	
415		Subsea Dispersant Injection Vessel Safety Case is approved by Local authority	0 hrs	Thu 15/04/21	Thu 15/04/21	414	416	Govt/Reg - Vessel Safety Case	No	No	No	No	
416		Subsea Dispersant Injection Vessel owner is notified and suspends any active operations	8 hrs	Thu 15/04/21	Fri 16/04/21	415	417,422	Company Rep, Subsea Response Organization	No	No	No	No	
417		Subsea Dispersant Injection Vessel transits to Offshore Operations Deployment Site	24 hrs	Sat 17/04/21	Sun 18/04/21	416,59	419,418	Company Rep, Vessel Owner,Subse Respo	No	No	No	No	
418		Subsea Dispersant Injection Vessel and crew complete Customs clearance process - vessel released to Company Rep (identified by	0 hrs	Sun 18/04/21	Sun 18/04/21	417	419		No	No	No	No	
419		Subsea Dispersant Injection Vessel and crew are mobilized at Offshore Operations Deployment Site	24 hrs	Sun 18/04/21	Mon 19/04/21	417,9,418	420,421	Company Rep, Subsea Response Organization	No	No	No	No	
420		Subsea Dispersant Injection Vessel ROV and LARS is prepared for work scope - crew, equipment maintenance/inspections, etc.	12 hrs	Mon 19/04/21	Mon 19/04/21	419,203,201	426	Vessel Owner, Company Rep,ROV Contr	No	No	No	No	
421		Subsea Dispersant Injection Vessel is prepared for work scope - fuel, provisions, crew, completes required equipment maintenance/inspections, etc.	8 hrs	Thu 29/04/21	Thu 29/04/21	419,224,237,339,3	426	Vessel Owner	No	No	No	No	
422		Gas detection equipment for Subsea Dispersant Injection Vessel is sourced and delivered to Offshore Operations Deployment Site	8 hrs	Fri 16/04/21	Sat 17/04/21	416,153	423	Vessel Owner	No	No	No	No	
423		Subsea Dispersant Injection Vessel owner designs/approves seafastening and installation plans for gas detection equipment, Transfer pumps and piping, Subsea Dispersant Injection equipment and Subsea Dispersant Conveyance equipment	4 hrs	Sat 24/04/21	Sat 24/04/21	237,332,339,422	424,425,426,427	Company Rep, SS Dispersant Conveyance Contractor SS Dispersant	No	No	No	No	
424		Gas detection equipment is installed on Subsea Dispersant Injection Vessel	2 hrs	Sat 24/04/21	Sat 24/04/21	423	469	Vessel Owner	No	No	No	No	
425		Subsea Dispersant Injection equipment is installed on Subsea Dispersant Injection Vessel	6 hrs	Sat 24/04/21	Sun 25/04/21	423,332,257,296	428	Vessel Owner, Subsea Response Organization	No	No	No	No	
426		Subsea Dispersant Conveyance System is installed on Subsea Dispersant Injection Vessel	40 hrs	Thu 29/04/21	Sat 1/05/21	423,339,420,421,2	428	Company Rep, SS Dispersant Conveyance	No	No	No	No	
427		Transfer pumps, piping, and associated dispersant transfer equipment are installed on Subsea Dispersant Injection Vessel	6 hrs	Sat 24/04/21	Sun 25/04/21	423,237,296	428	Company Rep, SS Dispersant Supplier	No	No	No	No	
428		Subsea Dispersant fluids are loaded onto Subsea Dispersant Injection Vessel	12 hrs	Sat 1/05/21	Sat 1/05/21	427,425,426,347,2	469	Crane Contractor,SS	No	No	No	No	

Delays the subsea dispersant injection, which delays tasks 608 and 870, which are successors to the Capping Stack deployment



	Task Mode	Task Name	Duration	Start	Finish	Predecessors	Successors	Resource Names	Rollup	Level 1	Level 2	Level 3	Justification for Time Estimates
466		**Subsea Dispersant Injection Mission**	**81 hrs**	**Wed 28/04/21**	**Sun 2/05/21**				**Yes**	**No**	**Yes**	**Yes**	
467		Subsea Dispersant Injection Plan, including pre-deployment checks and dispersant re-supply procedures, is developed and submitted for approval	4 hrs	Wed 28/04/21	Thu 29/04/21	133,164,457,29,3	468	Company Rep, Incident Command Team ROV Contractor,SS	No	No	No	No	
468		Subsea Dispersant Injection Plan is approved	4 hrs	Thu 29/04/21	Thu 29/04/21	467	469,421,437,439	Company Rep, ROV Contractor,Sub Res	No	No	No	No	
469		Subsea Dispersant Injection vessel transits to incident site and notifies SIMOPS team upon arrival	4 hrs	Sat 1/05/21	Sat 1/05/21	215,216,442,468,1	470	Company Rep, ROV Contractor,SIM Tea	No	No	No	No	
470		SIMOPS team approves subsea dispersant injection activities and Subsea Dispersant Injection equipment is installed at seabed	8 hrs	Sat 1/05/21	Sun 2/05/21	469,153	471	Company Rep, ROV Contractor,Sub Res	No	No	No	No	
471		Subsea Dispersant Injection begins and continues as determined by Company Rep (identified by title)	1 hr	Sun 2/05/21	Sun 2/05/21	470,440	608,870	Company Rep, Incident Command Team	No	No	No	No	

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Improved outcomes to support preparedness

- Response planning is highly detailed and complex.
- The RTM is a tool to help delineate the critical path and therefore priorities.
- The principle of ALARP is to undertake all reasonable preparedness actions to enable the project to be completed in the shortest reasonable timeframe.

- As per the case example,
    - A downline solution for subsea dispersant conveyance would improve the overall project timeline.
    - Is the timeline improvement significant to the end outcome (note: some tasks can occur concurrently).
    - Are the improvement actions reasonable (cost verses benefit)?
    - Does it represent ALARP?
    - Document reasoning (the ‘Justification for Time Estimates’ provides stakeholder information).

Report 592 Conclusions

1. Having a robust understanding of response times and critical path activities is a key part of the Regulator's environmental assessment process.
2. The RTM was developed to be available to all and promote consistency in response planning.
3. The tool can be used in preparedness activities to help identify critical path tasks or establish priorities.
4. The tool can be used to support the organisation and coordination of response.

Australian Application

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The RTM in use (case example):

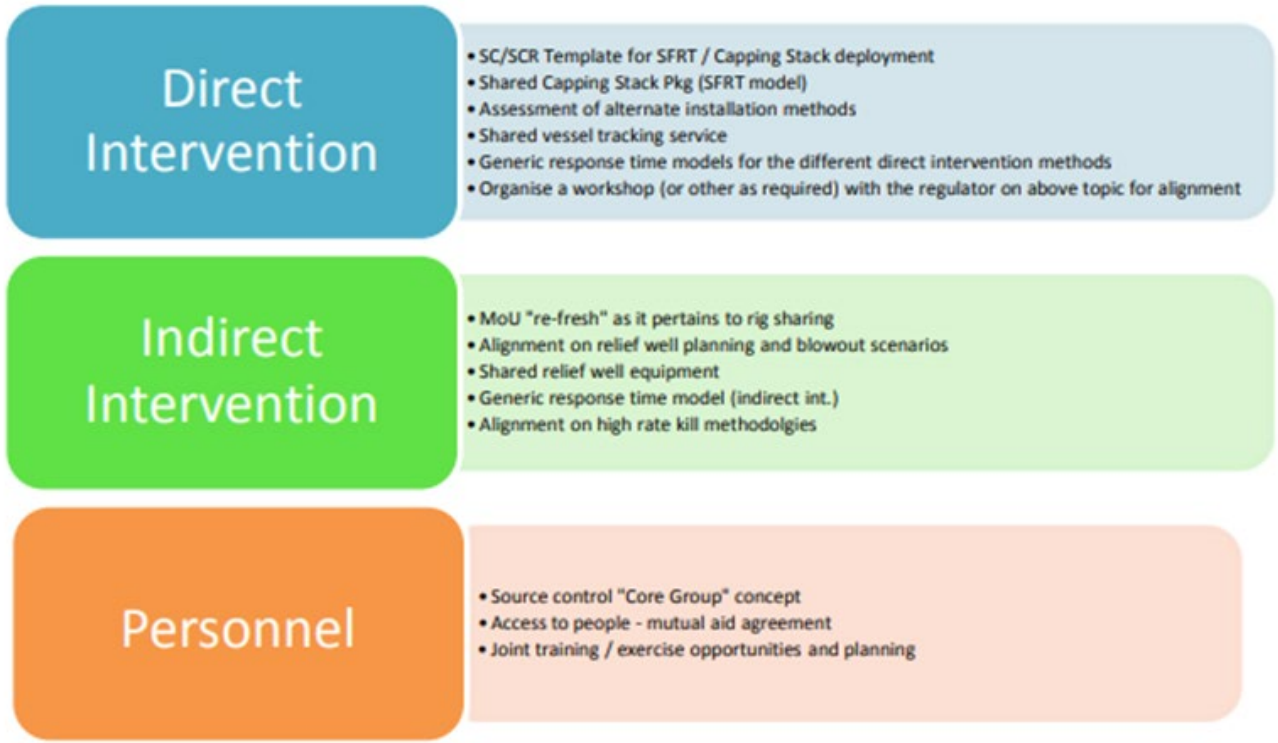
- The APPEA Drilling Industry Steering Committee (DISC)

Source Control Response Industry Working Group – Terms of Reference:

Purpose:

The Source Control Response Industry (SCRI) working group is to share and collaborate on Australian Offshore Titleholders' ("Titleholders") existing source control response plans. The Working Group will explore and act on opportunities to align and strengthen the Titleholders' source control emergency response capability though "mutual aid" initiatives and drive continuous improvement by implementing fit-for-purpose and effective source control emergency response strategies.

- Work Streams



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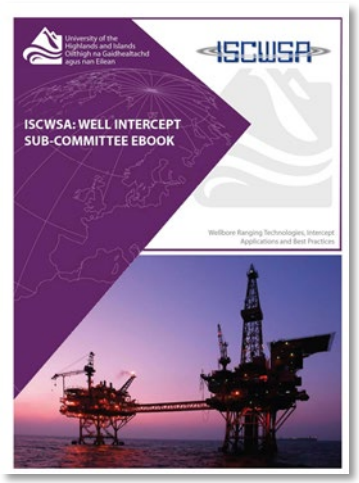
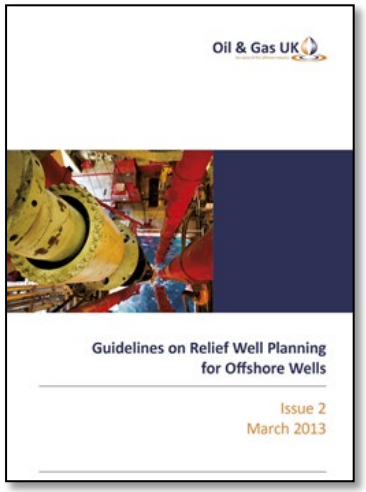
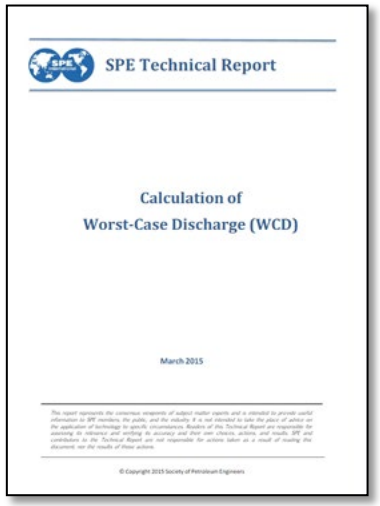
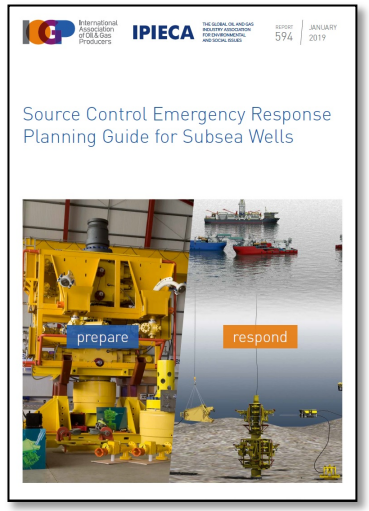
APPEA DISC

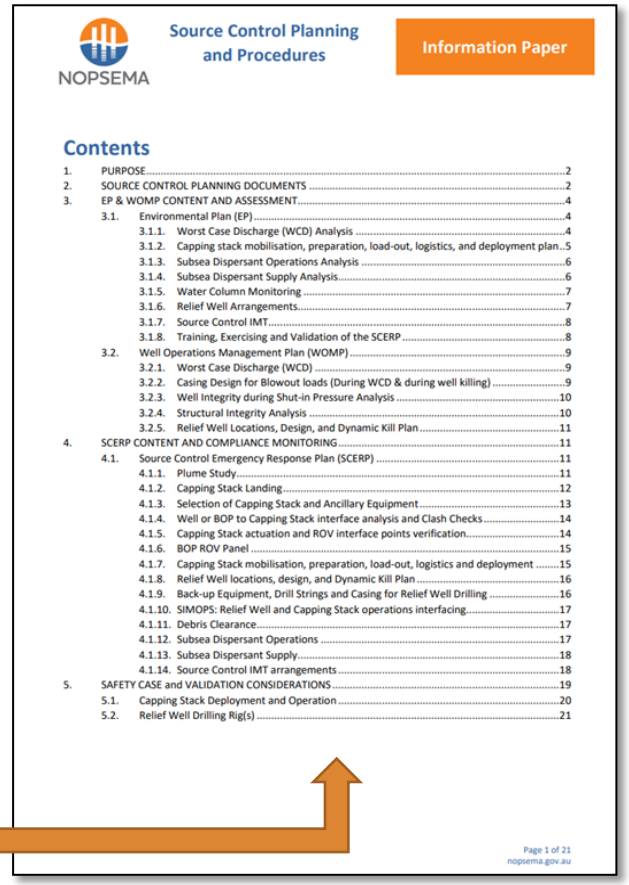
- Produced an **Australian Offshore Titleholders Source Control Guideline** that includes, partnerships, agreements and plans for the selected initiatives. This Plan can be expanded by the relevant Titleholder to cover any project specific requirements.
- Gathered and applied information from all relevant sources:











Including this recently developed NOPSEMA Information Paper

NOPSEMA

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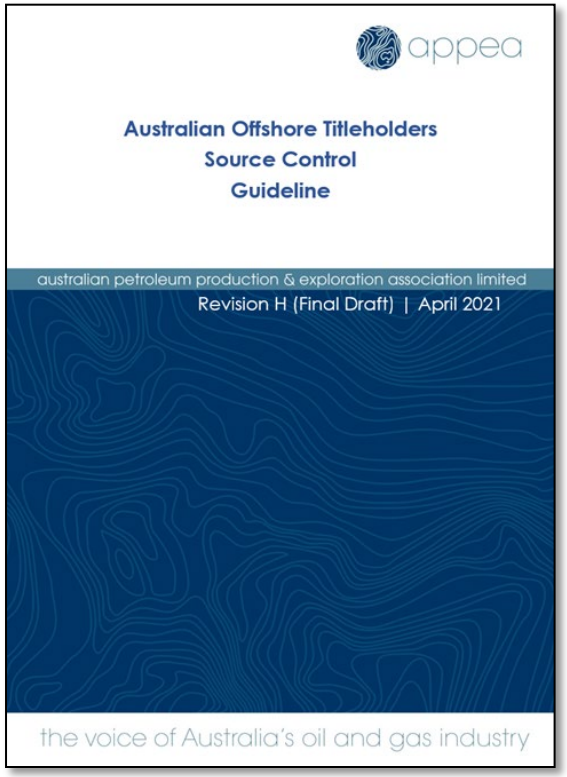
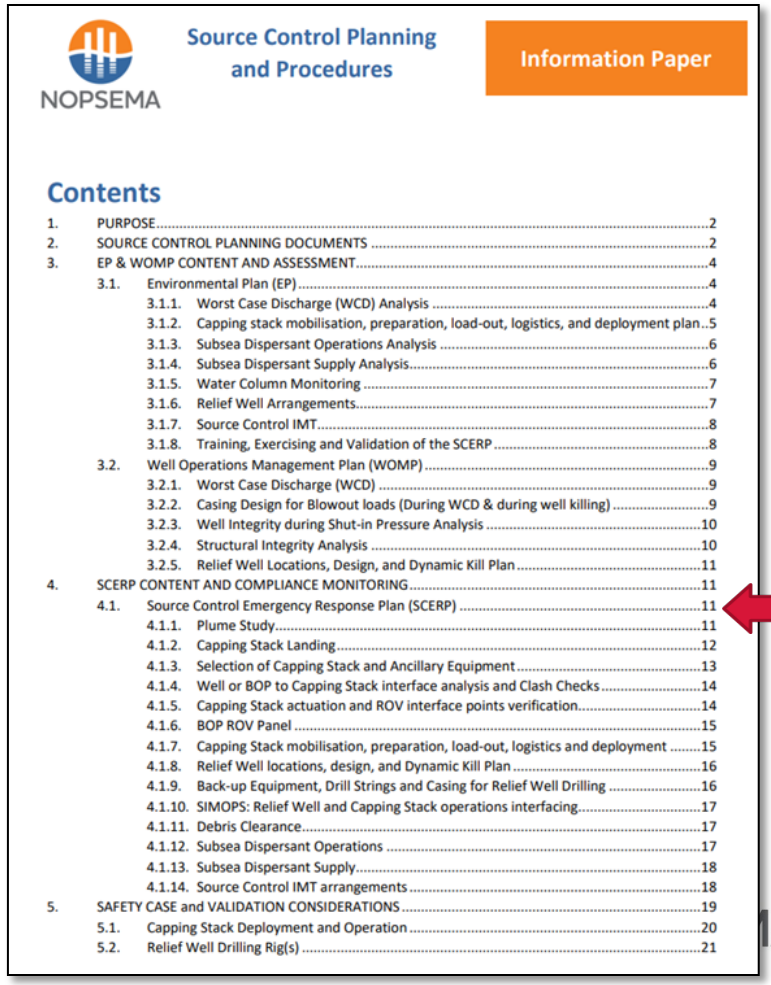
The RTM in use (case example):

- Information Paper: Source Control Planning and Procedures
  - NOPSEMA's expectations with regards to source control planning content of:
    - Environmental Plan (EP)
    - Well Operating Management Plan (WOMP)
    - Source Control Emergency Response Plan (SCERP)
  - Reflects the content of IOGP Report 594 and the RTM



Consistent



Recommends use of globally accepted Project Planning tools e.g. the RTM

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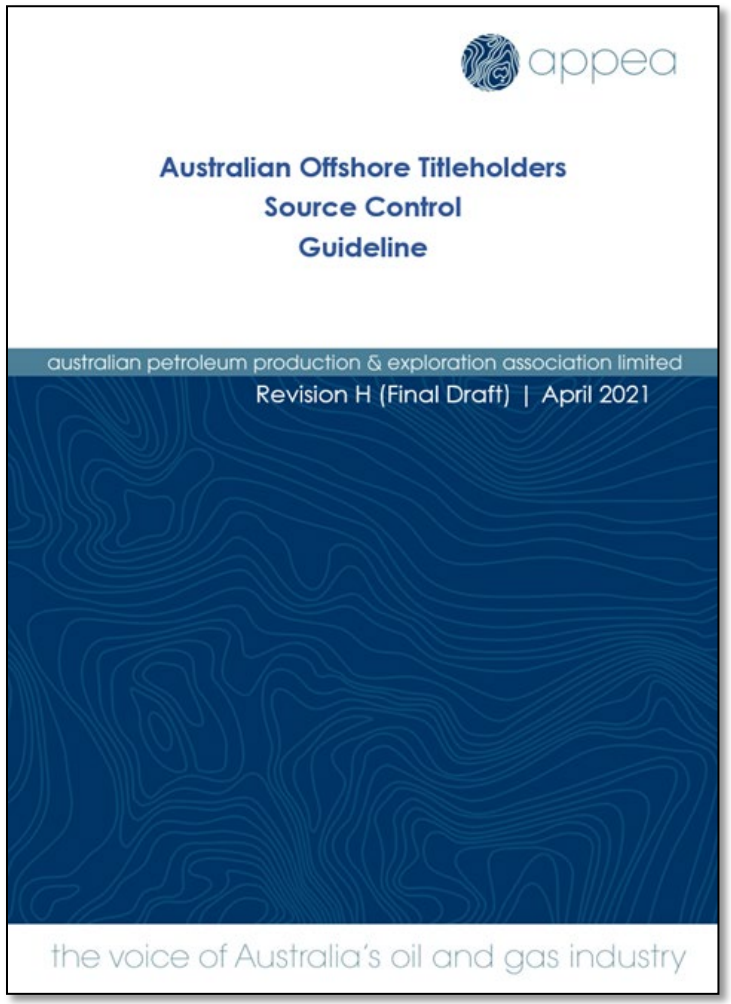
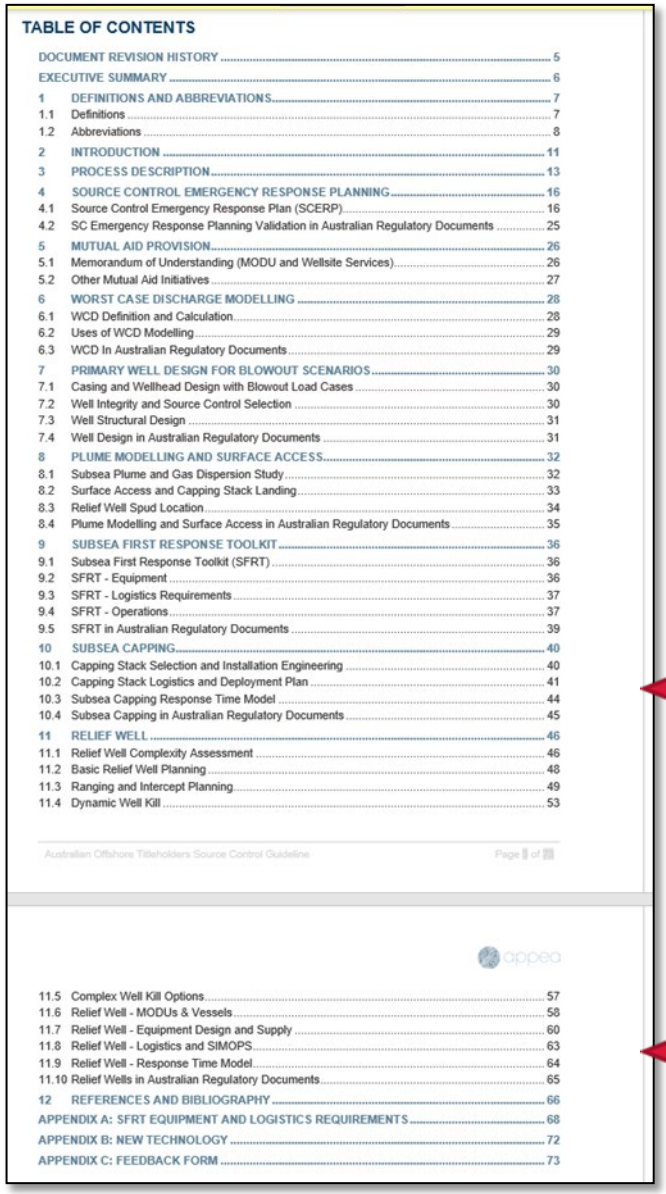
The RTM in use (case example):





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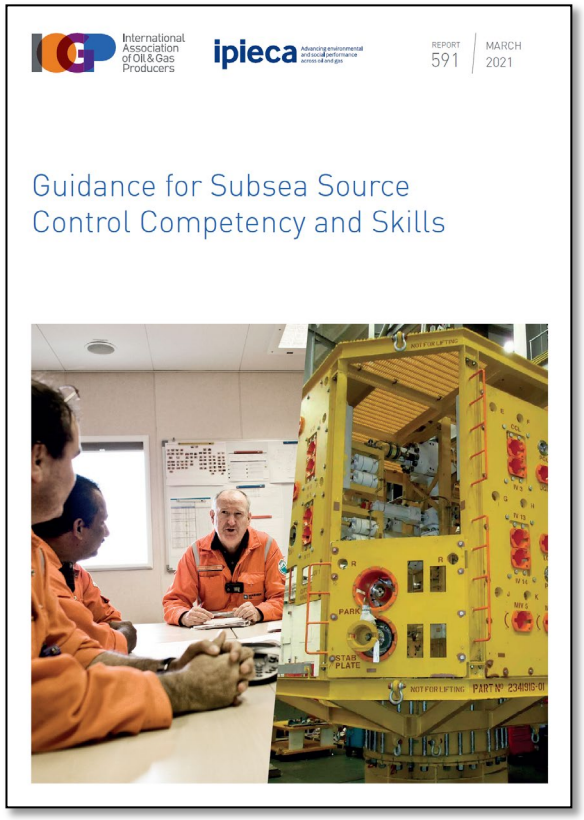

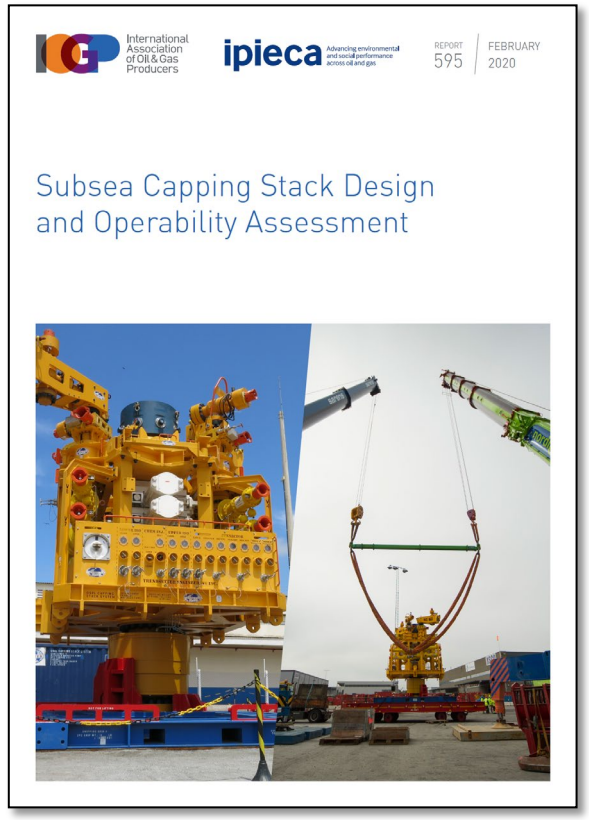

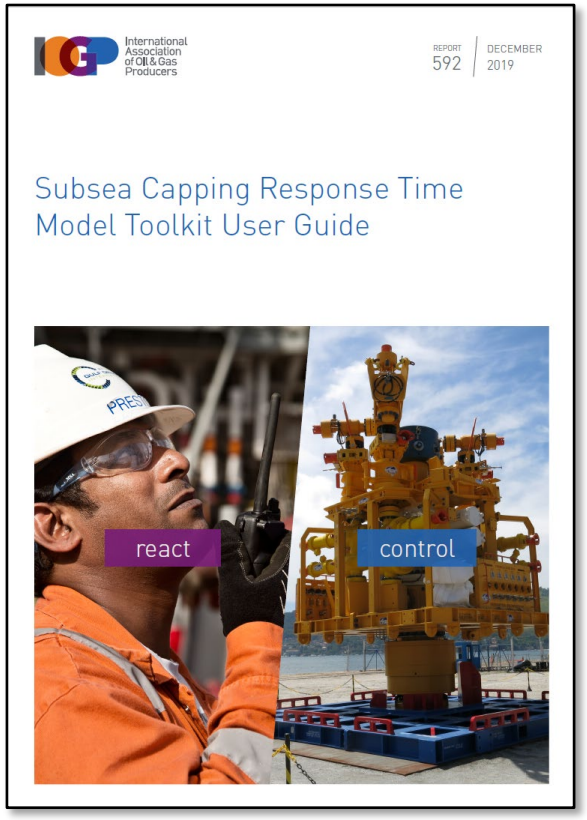

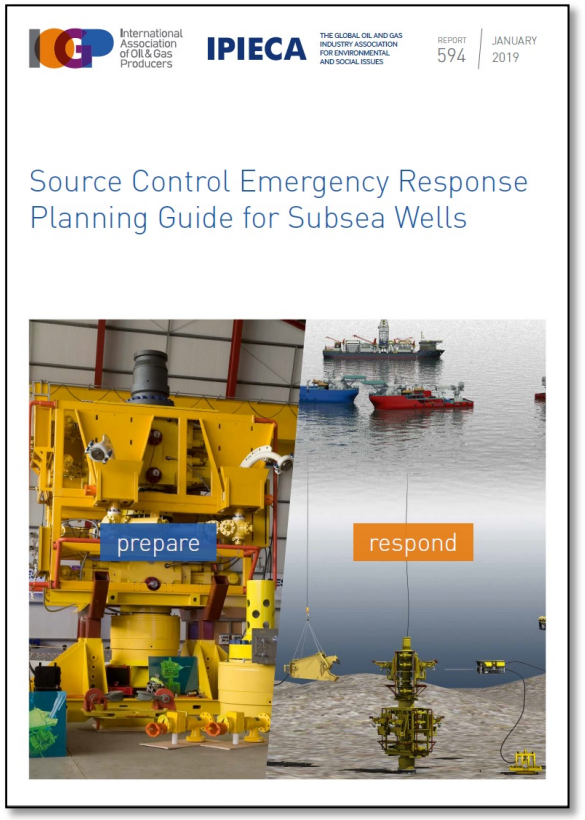

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Thank You & Questions

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