



DOW ALTONA GROUNDWATER REMEDIATION 2019 UPDATE

DOW ALTONA

Tuesday 6 August 2019

AGENDA

- Project background
- Review of Clean Up Plan implementation progress
- Questions and discussion

PROJECT BACKGROUND

- Regulatory drivers:
 - Clean Up Notice (CUN)
 - ✓ Received in January 2016
 - ✓ Clean Up Plan (CUP) and Auditor Verification Report submitted to the EPA in February 2016
 - ✓ CUP formally approved by the EPA in April 2016
 - ✓ Since April 2016 CUP implementation in progress
 - Pollution Abatement Notices (PANs) for site areas not included in the CUN/CUP:
 - ✓ Received in October 2017
 - ✓ Since October 2017 assessments completed and report to EPA on track for August 2019

REVIEW OF THE CUP

- The CUP is a 200+ page technical document to present and discuss:
 - Background, regulatory requirements and key drivers for clean up
 - Conceptual Site Model (CSM) unique to Altona site
 - Remediation objectives
 - Previous and current remediation measures
 - Remediation strategy, implementation and timetable
- The CUP includes key supporting documents (e.g., a detailed Groundwater Management Plan), along with executive summaries of key source materials
- CUP was reviewed and endorsed by two EPA-appointed independent auditors
- Formally approved by EPA on April 2016
- Five-yearly review and update by April 2020

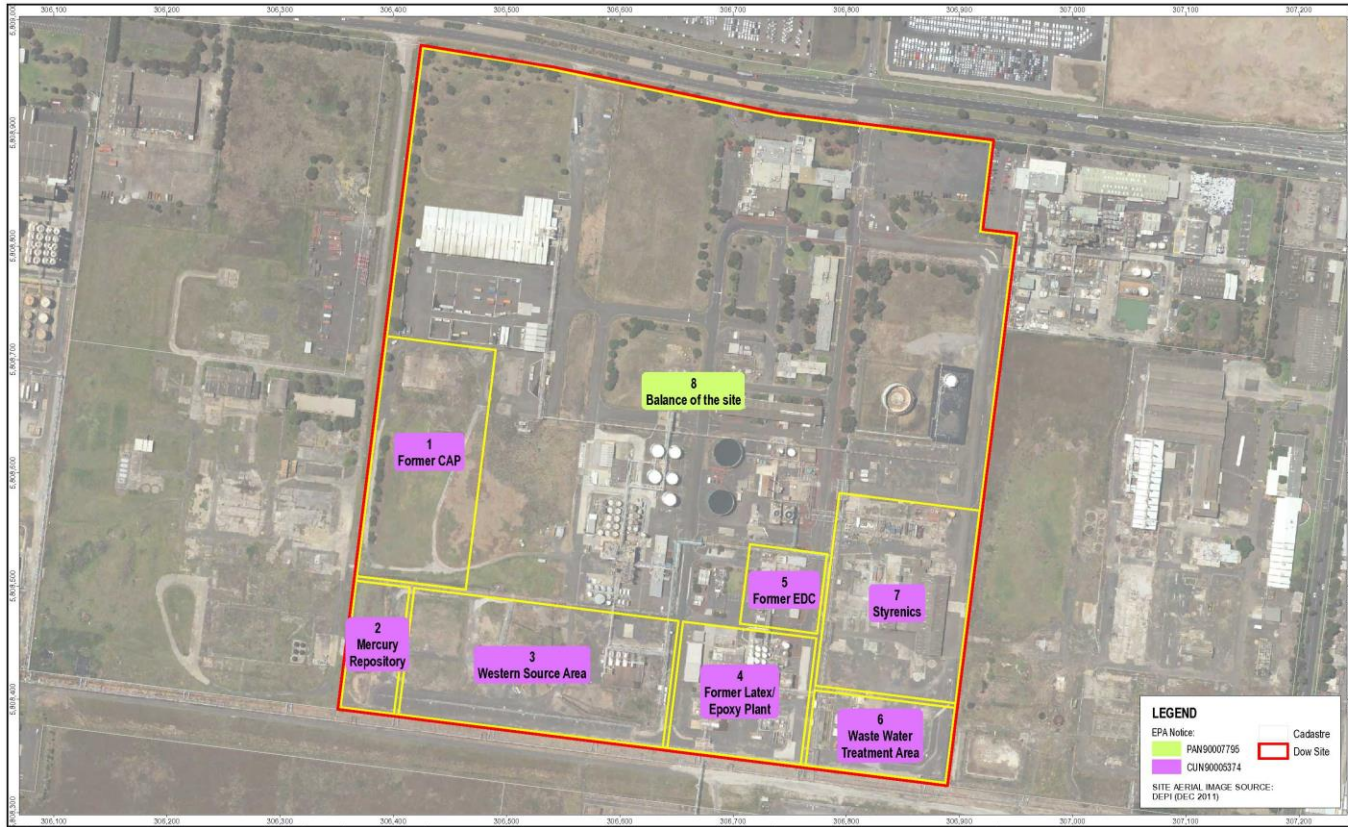


CUP – REMEDIATION STRATEGY

- Reduce volume of heavily impacted soil and groundwater on site
- Reduce quantity of contaminants flowing off site through groundwater
- Monitor new technological developments and adopt where appropriate
- Keep independent Auditors informed and involved as work progresses



SITE SUB-AREAS



CUP ROAD MAP

Area	Objective	#	Sub-Area	Main COPC	Stage	EPA Notice Reference	Technology	Due date	Main Non-Dow Stakeholders
Onsite	Reduce mass discharge by > 1 OOM by 2021	1	Former Chloralkali Plant	Mercury	Remediation	CUN90005374	Soil stabilisation and off site disposal	March 2020	ERM, EPS
		2	Repository	Mercury	Pre remedial studies	CUN90005374	Soil stabilisation and off site disposal	NA	ERM
		3	Western Source Area	Chlorinated Hydrocarbons	Remediation	CUN90005374	<i>EISB</i>	Ongoing	Goodwin, Geosyntec
							<i>SVE</i>	Ongoing	Goodwin, Coffey
							<i>ISCR</i>	Ongoing	Goodwin
							<i>PRB</i>	Ongoing	ERM
		4	Former Latex / Epoxy Plant	Chlorinated Hydrocarbons	Detailed site investigation	-	-	Ongoing	ERM
					Remediation	CUN90005374	<i>EISB, MNA</i>	Ongoing	Goodwin, Geosyntec
		5	Former Ethylene Dichloride Plant	Chlorinated Hydrocarbons	Remediation	CUN90005374	<i>EISB</i>	Ongoing	Goodwin, Geosyntec
<i>RFH</i>	Ongoing						ERM		
6	Waste Water Treatment Area	Petroleum Hydrocarbons	Remediation	CUN90005374	<i>EISB, P&T</i>	Ongoing	Goodwin, Geosyntec		
7	Styrenics	Petroleum Hydrocarbons	Remediation	CUN90005374	Soil disposal, <i>SVE</i>	Ongoing	EPS, Coffey		
8	Balance of the site	TBC	Detailed site investigation	PAN90009436	-	August 2019	ERM		
Offsite	Reduce contamination in groundwater by 1 OOM by 2036	9	Commercial	Chlorinated Hydrocarbons	Remediation	CUN90005374	<i>MNA</i>	Ongoing	Coffey Ajax/Slough Rd Properties, HBCC
					Remedial works out to tender	CUN90005374	<i>EISB / Groundwater recirculation</i>	April 2020	
		10	Residential	Chlorinated Hydrocarbons	Remediation	CUN90005374	<i>MNA</i>	Ongoing	Coffey, HBCC, Residences

Target of the remediation

Technologies in **RED** indicate source removal technologies

Technologies in **BLUE** indicate containment technologies

Technologies in **ITALICS** are primarily for **Source Removal** AND secondarily for **Containment** (or vice versa, based on colour)



SUB-AREA 1 – FORMER CHLORALKALI PLANT (CAP)

- Status
 - Remediation in progress
- Progress since last community update
 - Completed tender process
 - Engaged remediation contractor
 - Commenced remediation (soil stabilisation and offsite disposal)
- Plans for 2019/2020
 - Safely complete remediation



SUB-AREA 2 – REPOSITORY

- Status
 - Pre-remedial studies completed
- Progress since last community update
 - On hold pending success in Chloralkali Plant (CAP) area
- Plans for 2019/2020
 - Undertake remediation upon completion of CAP project



SUB-AREA 3 – WESTERN SOURCE AREA

■ Status

- Remediation in progress
- Technologies currently being implemented:
 - ✓ Enhanced In-Situ Bioremediation (EISB)
 - ✓ Soil Vapour Extraction (SVE)
 - ✓ In-Situ Chemical Reduction (ISCR)

■ Progress since last community update

- Continued groundwater and soil vapour monitoring
- EISB
 - ✓ Completed additional amendment injections
- SVE
 - ✓ Installed 10 new wells to expand the SVE system
- ISCR
 - ✓ Pilot test in progress for Permeable Reactive Barrier (PRB) to treat groundwater using zero-valent Iron (ZVI)



SUB-AREA 3 – WESTERN SOURCE AREA (CONTINUED)

- Plans for 2019/2020
 - EISB
 - ✓ Continue remediation and expand EISB to deeper levels in the westernmost part of the sub-area
 - SVE
 - ✓ Continue remediation
 - ✓ Optimise the system
 - ISCR
 - ✓ Continue monitoring effectiveness of the PRB pilot test



SUB-AREA 4 – FORMER LATEX EPOXY PLANT

- Status
 - Remediation in progress
 - Technologies currently being implemented:
 - ✓ Monitored Natural Attenuation (MNA)
 - ✓ EISB
- Progress since last community update
 - Continued groundwater monitoring
 - Completed further assessments
 - Established a downgradient biobarrier using EISB
- Plans for 2019/2020
 - Continue remediation and monitoring
 - Evaluate future remedial options



SUB-AREA 5 – FORMER ETHYLENE DICHLORIDE PLANT

- Status
 - Remediation in progress
 - Technology currently being implemented:
 - ✓ EISB
 - ✓ Radio Frequency Heating (RFH) pilot system
- Progress since last community update
 - Continued groundwater and soil vapour monitoring
 - Completed installation and start up of the RFH system
- Plans for 2019/2020
 - Continue remediation and monitoring
 - Conduct further amendment injections



SUB-AREA 6 – WASTE WATER TREATMENT AREA

- Status
 - Remediation in progress
 - Technology currently being implemented:
 - ✓ EISB
 - ✓ Pump and Treat (P&T)
- Progress made since last community update
 - Continued groundwater monitoring
- Plans for 2019/2020
 - Continue remediation and monitoring



SUB-AREA 7 – STYRENICS

- Status
 - Remediation in progress
 - Technology currently being implemented:
 - ✓ Passive SVE
 - ✓ Soil excavation and offsite treatment / disposal as required
- Progress made since last community update
 - Conducted activities to counteract water entering the SVE system
- Plans for 2019/2020
 - Re-assess the effectiveness of passive SVE due to the presence of excessive water
 - Identify local source of water to determine future options



SUB-AREA 8 – BALANCE OF THE SITE

- Status
 - Assessments in progress
- Progress made since last community update
 - Initial PAN revoked upon completion of the Phase I Environmental Site Assessment
 - March 2019: received a subsequent PAN to undertake a Detailed Site Assessment (DSI)
- Plans for 2019/2020
 - Complete assessment and deliver report to EPA
 - Propose integrating sub-area 8 within the CUN/CUP to improve coordination of separate activities



OVERVIEW OF OFF-SITE ENVIRONMENTAL MONITORING AREAS (EMAs)



SUB-AREA 9 – OFFSITE

- Status
 - Remediation in progress
 - Technology currently being implemented:
 - ✓ Monitored Natural Attenuation (MNA)
 - ✓ EISB Pilot test
- Progress made since last community update
 - Continued groundwater and soil vapour monitoring
 - Completed design of the full scale Offsite EISB system
 - Commenced tendering process
 - Some permits obtained and other requirements under discussion

Layout of the Commercial Area Groundwater Recirculation & EISB System



SUB-AREA 9 – OFFSITE (CONTINUED)

- Progress towards CUP objectives
 - Groundwater plume is stable and concentrations continue to slowly attenuate
- Plans for 2019/2020
 - Continue monitoring
 - Commence construction of the Offsite EISB system pending resolution of statutory requirements

Layout of the Commercial Area Groundwater Recirculation & EISB System



SUB-AREA 10 – OFFSITE (CONTINUED)

- Progress made since last community update
 - Continued groundwater and soil vapour monitoring
 - Reviewed and updated the groundwater monitoring plan
- Plans for 2019/2020
 - Continue monitoring
 - Review and update the soil vapour monitoring plan



CONCLUSIONS

- Good progress on key implemented technologies
- Highlights of the year were installation of the RFH system and starting the CAP Project
- Emerging technologies continue to be actively investigated and applied
- Most timelines to achieve CUP objectives were met



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