

Environmental and Social Impact Assessment Report (ESIA) – Appendices 15-19

Project Number: 50330-001
February 2018

INO: Rantau Dedap Geothermal Power Project (Phase 2)

Prepared by PT Supreme Energy Rantau Dedap (PT SERD) for Asian Development Bank

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Appendix 7

EIA Regional Commission Meeting Results and Minutes of Meeting



BERITA ACARA
RAPAT KOMISI PENILAI AMDAL PUSAT
PEMBAHASAN ANALISIS DAMPAK LINGKUNGAN HIDUP (ANDAL),
RENCANA PENGELOLAAN LINGKUNGAN HIDUP DAN RENCANA PEMANTAUAN
LINGKUNGAN HIDUP (RKL-RPL) RENCANA KEGIATAN PENGUSAHAAN PANAS BUMI
UNTUK PLTP RANTAU DEDAP DENGAN KAPASITAS 250 MW YANG BERLOKASI
DI KABUPATEN MUARA ENIM, KABUPATEN LAHAT, DAN KOTA PAGAR ALAM,
PROVINSI SUMATERA SELATAN
OLEH PT SUPREME ENERGY RANTAU DEDAP

Nomor: 91 /BA/DIT.PDI.UK/L.HK/2016

- | | |
|-----------------------|--|
| • Hari/Tanggal | : Kamis/29 September 2016 |
| • Tempat | : Griya Sintesa
Jl. Karet No. 70, Kelurahan Air Lintang
Muara Enim, Sumatera Selatan |
| • Penrakarsa Kegiatan | : PT Supreme Energy Rantau Dedap |
| • Penanggung Jawab | : Muhammad Arif Tarunaprawira |
| • Jabatan | : Senior Manager SHE |
| • Pimpinan Rapat | : Direktur Pencegahan Dampak Lingkungan Usaha dan Kegiatan,
Kementerian Lingkungan Hidup dan Kehutanan,
<i>selaku</i>
Sekretaris Komisi Penilai AMDAL Pusat |

1. Anggota Komisi Penilai AMDAL Pusat yang hadir adalah:
 - a. Wakil dari Badan Lingkungan Hidup Provinsi Sumatera Selatan;
 - b. Wakil dari Bappeda Provinsi Sumatera Selatan;
 - c. Wakil dari Dinas Perhubungan, Komunikasi dan Informatika Provinsi Sumatera Selatan;
 - d. Kepala Badan Lingkungan Hidup Kabupaten Muara Enim;
 - e. Wakil dari Bappeda Kabupaten Muara Enim;
 - f. Wakil dari Dinas Pertambangan dan Energi Kabupaten Muara Enim;
 - g. Wakil dari Dinas Perhubungan Kabupaten Muara Enim;
 - h. Wakil dari Dinas Pekerjaan Umum, Bina Marga dan Pengairan Kabupaten Muara Enim;
 - i. Wakil dari Dinas Kehutanan Kabupaten Muara Enim;
 - j. Wakil dari Dinas Kesehatan Kabupaten Muara Enim;
 - k. Wakil dari Badan Lingkungan Hidup Kabupaten Lahat;
 - l. Wakil dari Bappeda Kabupaten Lahat;
 - m. Wakil dari Dinas Pertambangan dan Energi Kabupaten Lahat;
 - n. Wakil dari Dinas Kehutanan dan Perkebunan Kabupaten Lahat;
 - o. Wakil dari Dinas Kesehatan Kabupaten Lahat;
 - p. Kepala Badan Pengelolaan Lingkungan Hidup Kota Pagar Alam;
 - q. Wakil dari Bappeda Kota Pagar Alam;
 - r. Wakil dari Dinas Sumber Daya Alam Kota Pagar Alam;
 - s. Wakil dari Dinas Kehutanan dan Perkebunan Kota Pagar Alam;
 - t. Wakil dari Dinas Kesehatan Kota Pagar Alam;
 - u. Wakil Masyarakat Kabupaten Muara Enim (Camat Semande Darat Ulu);
 - v. Wakil LSM Kabupaten Muara Enim (LSM Lingkungan Sekundang);
 - w. Wakil Masyarakat Kabupaten Lahat (Kepala Desa Sukarami, Kepala Desa Lawang Agung, Kepala Desa Karang Endah);
 - x. Wakil LSM Kabupaten Lahat (Ketua LSM Laskar Hijau);
 - y. Wakil Masyarakat Kota Pagar Alam (Camat Dempo Selatan, Lurah Kance Diwo, Lurah Penjalang);

(U)

- aa. Wakil dari Direktorat Pencegahan Dampak Lingkungan Usaha dan Kegiatan, Kementerian Lingkungan Hidup dan Kehutanan.
2. Rapat Komisi Penilai AMDAL Pusat dalam rangka pembahasan dokumen Analisis Dampak Lingkungan Hidup (ANDAL), Rencana Pengelolaan Lingkungan Hidup dan Rencana Pemantauan Lingkungan Hidup (RKL-RPL) Rencana Kegiatan Pengusahaan Panas Bumi untuk PLTP Rantau Dedap dengan Kapasitas 250 MW yang berlokasi di Kabupaten Muara Enim, Kabupaten Lahat, dan Kota Pagar Alam, Provinsi Sumatra Selatan oleh PT Supreme Energy Rantau Dedap. Pemrakarsa menyepakati untuk melakukan beberapa hal sebagai berikut:
- a. memperjelas deskripsi kegiatan eksisting dan rencana kegiatan, antara lain: koordinat sumur, sistem pengelolaan air limbah, CSR, penggunaan bahan peledak, kebutuhan turbin, desain sumur injeksi, pengelolaan limbah medis, mobilisasi alat dan bahan, pengelolaan limbah B3, sistem tanggap darurat seperti *emergency shut down* pada kondisi abnormal H₂S, luas kebutuhan lahan baik yang berada di Kawasan Hutan maupun di luar Kawasan Hutan, mekanisme rekrutmen tenaga kerja untuk tiap tahapan kegiatan, tahap pasca operasi antara lain mekanisme pencerahan kembali lahan yang telah dilakukan;
 - b. menjelaskan secara konsisten kegiatan eksisting beserta perizinan yang dimiliki dan rencana kegiatan yang dilingkup dalam dokumen lingkungan ini;
 - c. memperjelas urgensi dan manfaat rencana kegiatan, khususnya untuk daerah yang menjadi lokasi rencana kegiatan serta dasar kewenangan penilaian AMDAL di Komisi Penilai AMDAL Pusat;
 - d. memperjelas kembali kesesuaian lokasi rencana kegiatan dengan Perda tata ruang setempat yang berlaku, baik Provinsi maupun Kabupaten/Kota, serta meng-overlay dengan PIPPIB revisi terbaru;
 - e. menyampaikan kesesuaian lingkup dokumen ANDAL ini dengan *feasibility study* yang diproses di Kementerian ESDM;
 - f. memperjelas kegiatan lain di sekitar lokasi rencana kegiatan termasuk jarak dan keterikaitan dampaknya serta meng-overlay-kan dalam peta dan citra landsat, antara lain: pemukiman penduduk, perkebunan kopi, dan Kawasan Hutan Desa;
 - g. meninjau kembali dan melengkapi data rona lingkungan awal dengan fokus pada komponen lingkungan yang kemungkinan terkena dampak atau yang relevan dengan rencana kegiatan serta menggunakan data terbaru dan hasil eksplorasi yang telah dilakukan, antara lain: data kesehatan masyarakat;
 - h. meninjau kembali konsistensi dan memperbaiki proses pelingkupan dengan mempertajam justifikasi pada evaluasi dampak potensial sampai dengan dampak penting hipotetik dengan memperhatikan deskripsi rencana kegiatan, komponen lingkungan, hasil konsultasi publik dan pengumuman, serta kegiatan lain di sekitar;
 - i. meninjau kembali penetapan batas wilayah studi, antara lain batas sosial dan batas ekologis, serta batas waktu kajian untuk tiap dampak penting hipotetik, dengan mempertajam justifikasi penetapannya;
 - j. meninjau kembali perhitungan besaran untuk masing-masing dampak disesuaikan dengan kapasitas PLTP yang dilingkup dalam dokumen ini dan ditempatkan dalam konteks lokasi dan kegiatan;
 - k. meninjau kembali kajian dampak parameter yang melebihi baku mutu, antara lain H₂S;
 - l. meninjau kembali kajian dampak terhadap kualitas udara, antara lain meninjau kembali hasil modeling untuk parameter TSP dan NH₃, peningkatan Gas Rumah Kaca, termasuk menyiapkan mitigasinya;
 - m. meninjau kembali kajian dampak gangguan lalu lintas, antara lain bangkitan dan tarikan pada mobilisasi alat dan material;
 - n. memperdalam kajian dampak penurunan kualitas air, antara lain dari timbulan limbah cair yang dihasilkan dari proses produksi;
 - o. meninjau kembali kajian dampak peningkatan *run off*, antara lain disesuaikan dengan kondisi pembukaan lahan yang dilakukan secara bertahap;
 - p. memperdalam kajian dampak aspek geologi antara lain kebencanaan (*geohazard*), longsor, lata air, kontaminasi air tanah, termasuk menyiapkan rencana mitigasinya;

- q. mempertimbangkan untuk mengkaji dampak sosial dan dampak turunannya, seperti potensi meluasnya pertambahan/pembukaan kawasan hutan, perubahan demografi berupa potensi mendekatnya penduduk yang bermukim di dekat lokasi rencana kegiatan, termasuk rencana mitigasinya;
 - r. mempertimbangkan mengkaji dampak terhadap ekosistem flora dan fauna di Kawasan Hutan, khususnya satwa yang dilindungi, termasuk melakukan analogi dengan kegiatan serupa;
 - s. meninjau kembali evaluasi holistik dampak penting beserta justifikasinya, dengan fokus untuk mendapatkan gambaran keterkaitan antar dampak penting, prioritas dan arahan pengelolaan dampak yang harus dilakukan;
 - t. meninjau kembali RKL-RPL dengan menperjelas relevansinya dan mengkonsistensikannya mulai dari dampak, sumber dampak, titik pemantauan, sampai pada institusi pengawas dan pelaporan serta menggunakan rencana pengelolaan dan pemantauan yang aplikatif, antara lain mempertimbangkan membuat skema komunikasi yang komprehensif dengan masyarakat, pengelolaan emisi H_2S dan CO_2 menyiapkan kuota tenaga kerja lokal dan mekanisme perekruitmen yang proaktif;
 - u. meninjau dan memperjelas kembali serta mengkonsistensikan metodologi yang akan digunakan, yang mencakup parameter yang dikaji, metode pengumpulan data dan analisis data, penentuan lokasi titik sampling, metode prakiraan dampak untuk masing-masing dampak penting hipotetik serta metode evaluasi dampak penting;
 - v. meninjau kembali dan memperjelas metode pengambilan sampel yang meliputi jumlah, lokasi, responden, waktu, serta justifikasi penetapananya termasuk peta pengambilan sampel;
 - w. melakukan koordinasi dengan instansi terkait baik di tingkat pusat maupun daerah sehubungan dengan pelaksanaan rencana kegiatan, khususnya terkait penggunaan kawasan hutan;
 - x. melakukan sosialisasi kepada pihak-pihak terkait serta masyarakat terkena dampak sehubungan dengan pelaksanaan rencana kegiatan;
 - y. meninjau kembali serta memperbaiki tampilan gambar dan peta-peta sehingga lebih informatif serta sesuai dengan kaidah kartografi;
 - z. meninjau kembali dan memperbaiki redaksional penulisan antara lain: kesalahan penulisan, satuan, sumber data, nomenklatur wilayah, daftar pustaka, serta inkonsistensi data dan informasi; dan
 - aa. meninjau kembali peraturan perundang-undangan yang diajukan, dengan memperhatikan peraturan terbaru dan terkait dengan rencana kegiatan dan dampak yang ditimbulkan, baik di tingkat pusat maupun daerah.
3. Berita Acara Rapat Tim Teknis Komisi Penilai AMDAL Pusat tanggal 27 September 2016, serta saran, masukan dan tanggapan dari anggota Komisi Penilai AMDAL Pusat, secara rinci merupakan bagian yang tidak terpisahkan dari Berita Acara ini.
4. Atas berbagai saran, masukan dan tanggapan, Pemrakarsa menyatakan akan menanggapi semua masukan yang disampaikan oleh peserta rapat.
5. Dokumen ANDAL, RKL - RPL hasil perbaikan akan disampaikan oleh Pemrakarsa kepada Komisi Penilai AMDAL Pusat selambat-lambatnya 30 (tiga puluh) hari kerja setelah notulensi diterima.

Demikian Berita Acara ini dibuat dengan sebenar-benarnya.

Pemrakarsa Kegiatan,


Muhammad Arief Tarunaprawira
Senior Manager SHE
PT Supreme Energy Rantau Dedap




Ary Sudijanto
*Direktur Pencegahan Dampak Lingkungan
 Usaha dan Kegiatan*
*Kementerian Lingkungan Hidup dan
 Kehutanan,*
selaku
Sekretaris Komisi Penilai AMDAL Pusat

NOTULENSI RAPAT KOMISI PENILAI AMDAL PUSAT PENILAIAN ANDAL RKL-RPL RENCANA KEGIATAN PENGUSAHAAN PANAS BUMI UNTUK PLTP RANTAU DEDAP 250 MW DI KABUPATEN MUARA ENIM, KABUPATEN LAHAN, DAN KOTA PAGAR ALAM, PROVINSI SUMATERA SELATAN OLEH PT SUPREME ENERGY RANTAU DEDAP (SERD)

Tanggal: 29 September 2016

NO.	MASUKAN	HAL	TANGGAPAN	HAL
DAERAH				
A				
1.	<p>Peruntukan wilayah IUP dalam RTRW Kabupaten Lahat</p> <ul style="list-style-type: none"> Berpedoman pada Perda Kabupaten Lahan Nomor 11 Tahun 2011 tentang RTRW Kabupaten Lahat 2012-2032 bahwa rencana pola ruang willyah Kabupaten Lahat adalah peruntukan pengembangan pembangkit listrik tenaga panas bumi (PLTB) yang diarahkan di Kecamatan Tanjung Sakti PUMI dan Desa Tunggul Bute Kecamatan Kota Agung. Sebagian areal masuk dalam kawasan lindung untuk itu untuk mempertahankan kawasan lindung maka sesuai arahan zonasi dalam RTRW Kabupaten Lahat adalah: Apabila ternyata di kawasan lindung terdapat indikasi adanya deposit mineral atau air tanah atau kekayaan alam lainnya yang bisa diusahakan dinilai amat berharga bagi negara, maka kegiatan budidaya di kawasan lindung tersebut dapat diizinkan sesuai dengan ketentuan peraturan perundang-undangan yang berlaku. 	I-3	Terima kasih atas informasinya	
2.	<p>Untuk pengelolaan dampak sosial ekonomi di area yang terkena dampak, maka PT. SERD perlu:</p> <ol style="list-style-type: none"> Berpedoman penuh dengan Keputusan Kepala Badan Pengendalian Dampak Lingkungan Nomor: Kep- 299/11/1996 tentang Pedoman Teknis Kajian Aspek Sosial Dalam Penyusunan Analisis Mengenai Dampak Lingkungan. Bekerjasama dengan pemerintah daerah untuk membangun pola/program pengembangan masyarakat/CSR yang sesuai dengan kebutuhan masyarakat dan program CSR yang sudah disusun oleh Pemerintah Kabupaten Lahat melalui Bappeda Kabupaten Lahat. Perlu dijelaskan dan disampaikan kepada Pemerintah Kabupaten Lahan melalui Sekretariat CSR Kabupaten Lahat program CSR yang telah disusun dan direalisasikan oleh PT. SERD. 	2-75 4-11	<ol style="list-style-type: none"> Sudah mengacu kepada peraturan tersebut Saran menjadi perhatian dan akan dipertimbangkan Saran menjadi perhatian dan akan dipertimbangkan 	
3.	Wilayah IUP PLTP PT. SERD sebagian besar berada di kawasan hutan lindung, dengan dibukanya akses jalan menuju ke lokasi PLTP hal ini akan membuka peluang terjadinya illegal logging atau perambahan hutan. Untuk itu PT. SERD perlu bekerjasama dengan perangkat desa dan instansi terkait untuk mengamankan fungsi kawasan hutan lindung tersebut.		PT SERD telah bekerja sama dengan instansi terkait mengenai illegal logging dan perambahan hutan	
4.	Untuk melihat perkembangan perekonomian masyarakat yang terkena dampak langsung terhadap pembangunan PLTP, maka selain data PDRB perlu diperjelas dan ditambahkan data dan tabel	2-79	Ideal sekali apabila hal-hal yang diajukan tersebut bisa disajikan dalam laporan, namun karena berbagai keterbatasan, baik ketersediaan data, waktu atau biaya	

NO.	MASUKAN	HAL	TANGGAPAN	HAL
	a. Jenis dan jumlah aktifitas ekonomi non-formal b. Efek ganda ekonomi (multiplier effect) c. Pendapatan asli daerah. d. Pusat-pusat pertumbuhan ekonomi. e. Fasilitas umum dan fasilitas sosial.		sehingga sering tidak dapat dilakukan.	
B	Syahrimi (Dinas Perhubungan Komunikasi dan Informatika Provinsi Sumatera Selatan)			
1.	Hasil prakiraan dampak penting pada dokumen ANDAL bahwa gangguan transportasi tergolong dalam kategori Dampak Tidak Penting (TP) dengan indikasi mobilisasi peralatan selama konstruksi.		Kajian prakiraan dampak terhadap gangguan transportasi dikategorikan sebagai Dampak negative Penting (-P)	3-8 dan 3-9
2.	Bahwa indikasi penyerapan tenaga kerja sampai dengan 2.110 orang merupakan suatu bangkitan dan tarikan perjalanan baru yang cukup besar (tenaga kerja tersebut menggunakan alat transportasi apa dari dan menuju ke tempat kerja). Kalau orang yang bekerja mencapai 2.110 orang indikasinya diperkirakan akan menimbulkan rata-rata 75 perjalanan (kendaraan) pada jam sibuk dan atau 500 perjalanan (kendaraan) setiap harinya.		Jumlah penyerapan kerja 2.110 orang merupakan angka kumulatif selama hampir 3 tahun, tidak terjadi dalam waktu bersamaan. Selain dari pada itu, kegiatan konstruksi terkonsentrasi di area proyek PT SERD, sehingga tidak mengganggu lalu lintas umum. Fasilitas akomodasi akan berada di dalam area proyek.	
3.	Pada daerah TC-1 cukup padat volume lalu lintas.		Sesuai dengan hasil kajian lokasi TC-1 paling padat kendaraan yang melintas di pagi hari (aktivitas masyarakat)	2-124 s/d 2-126
4.	Melihat kondisi indikasi pada point 1, 2, dan 3 diatas bisa terjadi gangguan transportasi yang harus dikaji <i>do nothing or do something</i> kajian dampak lalu lintasnya.		Kajian dampak gangguan lalu lintas telah diperbaiki.	
5.	Berdasarkan UU 22/2009 tentang Lalu Lintas dan Angkutan Jalan, PP No. 32 Tahun 2011 tentang Manajemen dan Rekayasa Pasal 48 ayat (4) dan Pasal 50 ayat (3) tentang Analisis Dampak, serta Manajemen Kebutuhan Lalu Lintas dan Angkutan Jalan. Peraturan Menteri Perhubungan Nomor PM 75 Taun 2015 serta Peraturan Gubernur Sumatera Selatan Nomor 26 Tahun 2015.		Terima kasih untuk sarannya.	
6.	Untuk memenuhi point (4) tersebut dengan indikasi pada poin (2) secara paralel disusun Dokumen Analisis Dampak Lalu Lintas berdasarkan kewenangan kelas jalan.		Dokumen AMDAL PT SERD adalah dokumen kajian lingkungan yang komprehensif yang sudah mengakomodir mengenai gangguan lalu lintas.	
7.	Menyarankan pihak pengelola dalam CSR: Menyediakan angkutan perintis bagi daerah disekitar lokasi yang belum tersentuh pelayanan angkutan umum/angkutan pedesaan.		Terima kasih untuk sarannya dan akan dikaji dalam rangka program CSR	
C	Komariyah, SKM (Dinas Kesehatan Kota Pagar Alam)			
1.	Mohon dijelaskan tentang penanganan limbah domestik apakah menggunakan IPAL peraturan atau yang “inobit” bisa diangkat dan dipindah).	1-16	Penjelasan penanganan limbah domestik telah tercantum dalam dokumen ANDAL	1-17
2.	Jumlah karyawan pada poin 1.2.2.6 sejumlah 2.100 orang akan tetapi pada halaman sebelumnya 1-28 jumlah karyawan yang dijelaskan di dalam tabel adalah sejumlah 2.100 orang. Pada point 1.2.3.1 juga disebutkan jumlah tenaga kerja pada tahap	1-43	Jumlah pekerja 2.110 orang adalah kumulatif selama masa konstruksi proyek (sekitar 30 bulan).	

NO.	MASUKAN	HAL	TANGGAPAN	HAL
	konstruksi adalah 200 orang padahal pada halaman selanjutnya jumlah tenaga kerja tahap konstruksi sesuai tabel i-16 tentang perhitungan kebutuhan air bersih hanya berjumlah 70 orang. Mohon disinkronkan dan jelaskan perbedaan yang dimaksud agar penentuan besarnya dampak juga dapat sinkron.			
3.	Gambar 4-1 pada bagan alir evaluasi dampak penting digambarkan bahwa dampak dari mobilisasi peralatan dan bahan material pada tahap konstruksi hanya menampilkan adanya peningkatan kebisingan, tidak digambarkan adanya peningkatan konsentrasi gas dan debu sebagai akibat dari mobilisasi peralatan dan bahan material pada tahap konstruksi tersebut.	4-4	Dalam gambar 4-1. Telah tergambaran adanya Dampak peningkatan konsentrasi gas dan debu (kualitas udara) dari kegiatan mobilisasi peralatan dan bahan material pada tahap konstruksi.	Gambar 4-1, hal 4-4
4.	Paragraf 2 disebutkan tentang kegiatan operasional yang diperkirakan akan bedampak pada penurunan kualitas udara ambien sebagai akibat pemboran sumur injeksi, pengujian sumur dan operasi turbin, akan tetapi tidak disebutkan parameter apa saja yang akan menjadi kajian pada kegiatan ini.	4-5	Di subbab 4.2. telah dijelaskan parameter kualitas udara dari kegiatan PLTP, yaitu H ₂ S	4-6
5.	Poin 4.2.1. penjelasan tentang rencana pengelolaan terhadap kemungkinan dampak yang terjadi berupa penurunan kualitas udara. Poin 1, 2, 3 hanya menjelaskan rencana pengelolaan terhadap kemungkinan sebaran debu yang muncul, belum dijelaskan rencana pengelolaan terhadap timbulnya gas H ₂ S dan NH ₃ .	4-7	Untuk arahan pengelolaan gas H ₂ S sudah tercantum di penjelasan setelah point 1,2 dan 3	4-6 s/d 4-7
6.	Mohon perbaikan teknis penulisan judul daftar pustaka di daftar isi. Seharusnya daftar pustaka tidak menggunakan "BAB"	RKL-RPL Daftar isi	Telah diperbaiki sesuai saran.	
7.	Pada tabel rencana pengelolaan dan pemantauan lingkungan untuk pengukuran kualitas udara, air dan kebisingan dilakukan 2 kali yaitu pada musim kemarau dan musim penghujan. Mohon dijelaskan dasar pertimbangan dalam pengelolaan dan pemantauan lingkungan yang dimaksud mengapa dilakukan pada 2 musim tersebut.	RKL-RPL 2-1 dan 3-1		
D	Drs. Roshan YM, M.Kes (Kepala Dinas Kesehatan Kota Pagar Alam)			
1.	Penanganan limbah medis tidak dijelaskan menggunakan IPAL permanen atau yang <i>mobil</i> (bisa diangkat dan dipindah). Mohon dijelaskan.	1-16	SERD telah memiliki SOP penanganan gawat darurat termasuk dengan penanganan limbah medis	
2.	Jumlah karyawan pada point 1.2.2.6 sejumlah 2.100 orang, akan tetapi pada halaman sebelumnya 1-28 jumlah karyawan yang dijelaskan di dalam tabel adalah sejumlah 2.110 orang. Hal ini sangat penting dalam rangka penentuan besarnya dampak. Mohon disinkronkan dan jelaskan perbedaan yang dimaksud.	1-43	Terima kasih untuk masukannya. Yang benar adalah 2.110 orang.	
3.	Jumlah tenaga kerja tahap konstruksi pada point 1.2.3.1 sejumlah 200 orang, akan tetapi pada halaman selanjutnya jumlah tenaga kerja tahap konstruksi yang dijelaskan di dalam tabel 1-16 tentang perhitungan kebutuhan air bersih hanya sejumlah 70 orang. Hal ini sangat penting dalam rangka penentuan besarnya dampak. Mohon dijelaskan perbedaan tersebut	1-43	Jumlah 70 orang merupakan jumlah pekerja yang ada pada satu waktu sehingga air bersih yang dibutuhkan cukup.	
4.	2.1.3.1.2 kependudukan secara umum disebutkan tentang dampak di dua kecamatan yaitu kecamatan Semende Darat Ulu kabupaten Muara Enim dan kecamatan Kota Agung kabupaten Lahat. Sedangkan kecamatan Dempo yang masuk kota Pagaralam tidak terkena dampak dengan alasan jarak yang relatif jauh. Mohon diperbaiki penulisan nama kecamatan di Kota Pagar Alam seharusnya Kecamatan Dempo	2-71	Telah diperbaiki	2-71

NO.	MASUKAN	HAL	TANGGAPAN	HAL
	Selatan , mohon diperbaiki.			
5.	Gambar 4-1 Pada bagan alir evaluasi dampak penting digambarkan bahwa dampak dari mobilisasi peralatan dan bahan material pada tahap Konstruksi hanya menampilkan adanya peningkatan kebisingan tidak digambarkan adanya peningkatan konsentrasi gas dan debu sebagai akibat dari mobilisasi peralatan dan bahan material pada tahap Konstruksi yang tersebut. Mohon dijelaskan.	4-4	Lihat jawaban C #3.	
6.	Paragraf 2 (dua) disebutkan tentang kegiatan operasional yang diperkirakan akan berdampak pada penurunan kualitas udara ambien sebagai akibat kegiatan pemboran sumur, injeksi, pengujian sumur dan operasi turbin, akan tetapi tidak disebutkan parameter apa saja yang akan menjadi kajian pada kegiatan ini. Mohon ditambahkan agar menjadi lebih jelas dan fokus.	4-5	Lihat jawaban C #4.	
7.	Point 4.2.1 menjelaskan rencana pengelolaan terhadap kemungkinan dampak yang terjadi berupa penurunan kualitas udara. Poin 1,2,3 hanya menjelaskan rencana pengelolaan terhadap kemungkinan sebaran debu yang muncul, belum dijelaskan rencana pengelolaan terhadap timbulnya gas H2S. Mohon ditambahkan point 4 untuk pengelolaan terhadap H2S.	4-7	Lihat jawaban C #5.	
E	Himawan Sutantu, A.md (Dinas Kehutanan dan Perkebunan Kota Pagar Alam)			
1.	Pada Peta 1-4 status hutan pada sumber peta, dicantumkan peta SK MenLHK Nomor: SK.454/MenLHK/Setjen/PLA.2/6/2016 tentang Kawasan hutan dan konservasi perairan Provinsi Sumatera Selatan.	1-7	Peta bersumber dari peta terbaru Dirjen Planologi Hutan yang mengelola tata hutan secara terpusat.	
2.	Pada Peta 1-5, peta indikatif penundaan pemberian izin baru. Pada sumber peta dicantumkan Peta SK MenLHK Nomor: SK 2300/MenLHK-PKTL/IPDSH/PLA.1/5/2016 tentang Penetapan Peta Indikatif Penundaan Pemberian Izin Baru Pemanfaatan Hutan, penggunaan kawasan hutan dan perubahan peruntukan kawasan hutan dan APL (revisi x).	1-8	Peta sudah diperbaiki menurut Revisi X PIPPIB.	Peta 1-5
3.	Pada Tabel 1-6 ringkasan kebutuhan lahan ditambahkan kolom lokasi (Kabupaten Muara Enim, Kabupaten Lahat dan Kota Pagar Alam). Agar jelas masing-masing luasan yang terpakai untuk kegiatan pengusahaan panas bumi untuk PLTP Rantau Dedap 250 MW dari total kebutuhan lahan 1.245.125 m ² /124,6 ha.	1-14	Detil lokasi per kabupaten telah ditambahkan di Tabel 1-5 dan 1-8.	
4.	Terdapat perbedaan luas area dan pemberi izin Pada narasi kompensasi lahan, luas areal pada HL 70 ha dan IPPKH dari KLHK. Sedangkan Pada Tabel 1-7 kebutuhan lahan Luas area 69,4 ha dan IPPKH dari Kementerian Kehutanan. Sedangkan kata pimpinan rapat IPPKH:82 ha.	1-19	Tabel 1-7 telah diperbaiki, total luas lahan yang dibutuhkan seluas 124,5 Ha, yang terdiri dari 115 Ha lahan yang berstatus hutan lindung (yang akan dimintakan IPPKH) dan 9,5 Ha lahan di APL (telah dibebaskan).	1-20
5.	Kurang sependapat, pada saat pelepasan uap ke atmosfer saat uji produksi, dimana gas H ₂ S dikeluarkan melalui rock muffler yang tingginya hanya 5 m, sehingga hanya berdampak terhadap tenaga kerja pemboran. Bagaimana dengan pohon/vegetasi yang ada disekitar sumur (Hutan Lindung) → tolong dikaji lebih dalam.	1-38	Telah dilakukan kajian mengenai persebaran H ₂ S	3-32 s/d 3-37

NO.	MASUKAN	HAL	TANGGAPAN	HAL
6.	Penjumlahan INP pada tingkat semai/lantai hutan: Nilai KR dan FR (diperbaiki).	2-50	Telah diperbaiki sesuai saran di Tabel 2-18 s/d 2-20.	
7.	Pada Tabel 1-5 ringkasan rencana kegiatan, ada kolom pemanfaatan lahan (kebon kopi → hutan) sebaiknya juga dilampirkan peta penutupan lahan. Jika dilihat pada Peta 2-9 tipe ekosistem di wilayah studi dan Peta 2-13 kegiatan lain disekitar lokasi kegiatan dimana pada wellpad B, C, E, K, N, M, L, X.	1-12	Peta 2-13 sudah mencakup sebagai peta penutupan lahan.	
8.	Ada perbaikan Perda: Perda terbaru: Perda No. 7 Tahun 2012 tentang RTRW Kota Pagar Alam Tahun 2012-2032.	1-3	Informasi diterima dan telah diperbaiki dalam dokumen	1-3
9.	Pada IPPKH seluas 82 ha, sebaiknya segera dilakukan penata batasan/tata batas, penting, takutnya ada pihak-pihak lain yang memanfaatkan ini.		Tabel 1-7 telah diperbaiki, total luas lahan yang dibutuhkan seluas 124,5 Ha, yang terdiri dari 115 Ha lahan yang berstatus hutan lindung (yang akan dimintakan IPPKH) dan 9,5 Ha lahan di APL (telah dibebaskan).	
F	Febriyanti, ST (SDA Kota Pagar Alam)			
1.	Pada dokumen RTRW Kota Pagar Alam mengacu pada Perda No. 14 Tahun 2003 sedangkan Perda RTRW Kota Pagar Alam yang dipakai saat ini adalah Perda No. 7 Tahun 2012 tentang Rencana Tata Ruang Wilayah Kota Pagar Alam Tahun 2012-2032.	1-3	Informasi RTRW terbaru akan ditambahkan.	1-3
2.	Tahap konstruksi, maupun pasca operasi tidak dicantumkan masalah jaminan kesehatan tenaga kerja, jaminan keselamatan tenaga kerja.		Jaminan kesehatan dan keselamatan tenaga kerja telah diatur oleh peraturan dan undang-undang yang terkait dan akan dilakukan oleh PT SERD sesuai dengan peraturan tersebut.	
3.	Dalam dokumen RKL-RPL tidak dibahas mengenai matrik dampak Limbah B3.		Rencaan Pengelolaan dan Pemantauan Lingkungan terhadap dampak peningkatan limbah B3 telah dicantumkan dalam dokumen	Tabel 2-1
G	Jauhari, ST (BPLH Kota Pagar Alam)			
1.	Nama institusi BLH → BPLH Kota Pagar Alam. Dinasker → Dinosnaker Kota Pagar Alam. Dishub → Dishubkominfo Kota Pagar Alam.	2-3 s.d 3-16	Terima kasih atas revisinya	2-3 s/d 3-16
2.	Mengapa pada tahap pra konstruksi, konstruksi dan operasi tidak mencantumkan K3 dan jaminan kesehatan tenaga kerja.	2-3 s.d 3-16	Jaminan kesehatan dan keselamatan tenaga kerja telah diatur oleh peraturan dan undang-undang yang terkait dan akan dilakukan oleh PT SERD sesuai dengan peraturan tersebut.	
3.	Mengapa pengelolaan LB3 tidak tercantum dalam matrik RKL-RPL?	2-3 s.d 3-16	Telah ditambahkan pengelolaan dan pemantauan Limbah B3	2-20 dan 3-15
4.	Apa komitmen PT. SERD apabila terjadinya tingkat pembangunan masyarakat di sekitar lokasi kegiatan?		PT SERD akan berkoordinasi dengan instansi terkait untuk menangani masalah ini.	
H	Ahmad Lagi Yainali, ST (Bappeda Kota Pagar Alam)			
1.	Untuk Perda RTRW Kota Pagar Alam bukan No. 7...Tapi Peraturan Daerah Kota Pagar Alam No. 7 Tahun 2012 tentang RTRW Kota Pagar Alam Tahun 2012-2032.		Informasi RTRW terbaru telah disesuaikan.	
I	Drs. Agus Akhmad, M.Si (BPLH Kota Pagar Alam)			
1.	Wilayah Pagar Alam adalah Kecamatan Dempo Selatan Kelurahan Penjalang.		Terima kasih atas informasinya	
2.	Agar menyinkronkan dengan dokumen UKL-UPL wellpad I SERD wilayah Pagar		Telah masuk dalam dokumen AMDAL	

NO.	MASUKAN	HAL	TANGGAPAN	HAL
	Alam.			
3.	Belum memasukkan pada lokasi pengelolaan pada wilayah Kelurahan Penjalang/Kecamatan Dempo Selatan. Apakah Pagar Alam tidak diberi kesempatan yang sama dengan Kabupaten Muara Enim dan Kabupaten Lahat.	RKL-RPL 2-3/2-5	Telah masuk dalam dokumen AMDAL	
J	Mukhlis, S.Ag., S.Sos., M.Si (Dinas Perhubungan Kabupaten Lahat)			
1.	Nama institusi terkait harus disebutkan.	2-10	Nama instansi terkait disesuaikan dengan kebutuhan	
2.	Titik rawan yang perlu dijaga harus disebutkan.		Telah disebutkan	
3.	Harus ada rambu-rambu lalu lintas sebagai informasi bagi pengguna jalan lainnya tahap aktivitas PLTP Rantau Dedap.		Saat ini telah dipasang rambu lalu lintas sesuai dengan kebutuhan	
4.	Kami tidak mendapat informasi tentang jumlah kendaraan yang akan beroperasi di lapangan terutama alat berat.		Telah dimasukkan dalam dokumen ANDAL	Tabel 1-9
5.	Tidak hanya menghindari kemacetan tetapi juga meminimalisir kecelakaan lalu lintas.		Telah dikaji dalam dokumen ANDAL	
6.	Harus ANDALALIN karena perkiraan tarikan dan bangkitan lebih dari 75 kendaraan (PM Hub 75 Tahun 2015).		Sudah termasuk dalam kajian studi AMDAL ini	
K	Ir. Mawardi (dinas Kehutanan dan Perkebunan Kabupaten Lahat)			
1.	Tolong ditampilkan/dilampirkan tim konsultan yang mengerjakan proyek ini.		Sudah ada dalam dokumen KA ANDAL	
2.	PT. SERD telah membebaskan 70 ha area hutan lindung. Tolong surat izin pinjam pakai kawasan hutan dilampirkan.	1-19	Sudah masuk dalam dokumen KA ANDAL	
3.	Jumlah total lahan yang akan digunakan 115 ha, pada Tabel 1.7 jumlah 124,5 ha. Tolong dipertegas yang benar data yang mana?	1-19	Luas lahan yang dibutuhkan seluas 124,5 Ha	Tabel 1-6
4.	Pengembalian lahan Lahan akan dikembalikan kepada negara dan/atau dijual pada pihak ketiga apabila tidak diperlukan lagi! Menurut pendapat kami lahan ini harus dikembalikan kepada pemerintah karena merupakan kawasan lalu dan status "pinjam pakai kawasan".	1-61	Lahan hutan lindung sesuai IPPKH akan dikembalikan ke pemerintah Namun lahan APL yang dibeli dari masyarakat, sebagai assets perusahaan, bisa dijual kembali.	
5.	Lokasi kegiatan terletak pada jalur utama patahan Sumatera dengan kondisi seismik tinggi. Kami hanya mengingatkan untuk lebih hati-hati dalam pelaksanaannya karena tidak tertutup kemungkinan timbul "Lapindo baru". Hal lain adalah bahaya longsor, harus benar-benar diteliti keberadaan bidang miring yang kedap air yang dapat menyebab longsor.	2-22	Terima kasih atas saran dan menjadi perhatian	
6.	Secara umum sudah disusun cukup baik, kami harap dapat dilaksanakan di lapangan sebagaimana semestinya.	RKL-RPL	Terima kasih atas saran dan menjadi perhatian	
L	Lepy Desmianti (BLH Kabupaten Lahat)			
1.	Jelaskan rencana pengelolaan Limbah B3.		Rencana pengelolaan Limbah B3 sudah dicantumkan dalam dokumen RKL-RPL	
2.	Dijelaskan FS nya sudah sejauh mana.		PT SERD telah menyelesaikan pekerjaan penyusunan Studi Kelayakan (Feasibility Study) pada bulan Februari 2016 yang kemudian menjadi acuan penyusunan ANDAL.	
3.	Peta layout kegiatan PT. SERD.		Gambar layout kegiatan PT SERD ada di Gambar 1-4.	
4.	Jelaskan rencana-rencana kegiatan/urutan kegiatan beserta dampak-dampak yang diperkirakan timbul dan pengelolaannya.		Rencana kegiatan serta dampak dan pengelolaannya dibahas di dalam dokumen ANDAL dan RKL-RPL.	

NO.	MASUKAN	HAL	TANGGAPAN	HAL
5.	Rencana reklamasi dikoordinasikan dengan KLHK untuk wilayah yang masuk kawasan hutan.		Terima kasih atas masukannya.	
6.	Pengelolaan gas-gas seperti H ₂ S yang ditimbulkan.		Terima kasih atas masukannya.	
M	Nunung Rahmawati, SKM (Dinas Kesehatan)			
1.	Andal Bidang kesehatan masyarakat Agar dilengkapi data-data yang terkait bidang kesehatan seperti: fasilitas kesehatan, masalah sanitasi (jamban, air bersih dan SPAL). Tabel 2.45 judul tidak sesuai dengan data.	2.89 2.1.3.3	Informasi fasilitas kesehatan ada di 2.1.3.3.2. Judul tabel telah disesuaikan di dokumen.	
2.	RKL-RPL <ul style="list-style-type: none"> • Gangguan kesehatan Melihat kasus penyakit yang ada di SDL wilayah proyek, kasus ISPA cukup tinggi dengan adanya PLTP diharapkan tidak memberikan dampak peningkatan kasus. Untuk itu perlu dilakukan pemantauan kesehatan terhadap masyarakat sekitar lokasi proyek dengan pemeriksaan kesehatan masyarakat secara berkala, dilakukan pengobatan masal. • Terhadap dampak kesehatan masyarakat yang bersumber pada lingkungan, misal: kondisi kualitas air tanah (air bersih dan sanitasi) tidak hanya menyediakan fasilitas sanitasi maupun penyuluhan, perlu adanya dukungan pemeriksaan laboratorium (seperti pemeriksaan kualitas air) yang dapat dilaksanakan secara berkala 6 bulan sekali. • Terhadap karyawan: juga perlu adanya pemeriksaan kesehatan secara berkala. • Pengelolaan limbah domestik harus tetap dilakukan pengolahan limbah tidak hanya dalam septik tank. • Untuk limbah B3 yang sifatnya pada bisa dilakukan kerjasama dengan puskesmas Pulau panggung, Puskesmas Muara Enim dan RSU Muara Enim. 	2-10	Terima kasih untuk masukannya. Pengololan limbah domestik sesuai dengan yang dijelaskan di dokumen.	
N	Hy. Sukaya dan A. Dani, ST (Dinas PU Bina Marga dan Pengairan Kabupaten Muara Enim)			
1.	Jalan akses masuk dari Kota Agung ke Tunggul Bute sepanjang 42,5 km.		Terima kasih atas informasinya	
2.	Jalan ada jenis peruntukannya jalan kabupaten, provinsi, dan negara.		Terima kasih atas informasinya	
3.	Drainase jalan harus lancar dan bagus secara teknik.		Terima kasih atas informasinya	
4.	PT. SERD ikut membangun jalan tersebut.		Terima kasih atas informasinya	
5.	PT. SERD izin pemakaian jalan.		Terima kasih atas informasinya	
O	Ir. Jerry Gunawan (Dinas Perhubungan Kabupaten Muara Enim)			
1.	Poin penanganan kesehatan, pada alenia ketiga bahwa klinik darurat tidak menghasilkan limbah medis yang ditangani secara khusus. Tolong jelaskan stahu saya didalam pelaksanaan pemboran ini mempunyai resiko yang tinggit terhadap pekerja, katakan seorang pekerja mengalami kecelakaan di lokasi pemboran dan perlu penanganan yang serius namun langkah awal minimal dilakukan tindakan darurat di klinik pada lokasi kerja dan harus diberikan suntikan penahan sakit untuk sampai ke	1-14	PT SERD telah mempunyai SOP penanganan limbah medik dari operasional klinik	

NO.	MASUKAN	HAL	TANGGAPAN	HAL
	rumah sakit terdekat. Apakah bekas/sisa botol suntikan tersebut bukan termasuk limbah medis?			
2.	Poin mobilisasi alat dan material Dalam hal ini, Dinas Perhubungan Kabupaten Muara Enim sangat mendukung dengan kegiatan ini namun sayang Dinas Perhubungan Kabupaten Muara Enim belum ada laporan berapa jumlah armada yang mendukung kegiatna ini sampai saat ini! Apakah jalan ke lokasi kerja sudah dilakukan Andalallin, minimal dokumen keselamatan lalu lintas maupun manajemen rekayasa.	1-22	Berdasarkan Peraturan Menteri Perhubungan No. 75 Tahun 2015, dalam kegiatan SERD ini tidak diperlukan studi Andalalin, karena bangkitan yang ditimbulkan tidak akan berubah secara signifikan. SERD sudah mempunyai SOP dalam rangka mobilisasi peralatan dan material	
P	Hendri Dinata, ST, MT (Dinas Pertambangan dan Energi Kabupaten Muara Enim)			
1.	Dengan menggunakan sistem sumur injeksi dalam produksi panas bumi menjadi listrik, maka perlu diperhatikan potensi kontaminasi terhadap air tanah sehingga dampaknya seminimal mungkin.	Bab I	Sudah diakomodasikan dalam dokumen	
2.	PT. SERD harus memastikan tidak adanya kebocoran limbah dalam sistem PLTP agar tidak mencemari pemanfaatan industri hilir panas bumi baik itu pada sistem separator, condenser maupun unit colling tower.	Bab I	Sudah diakomodasikan dalam dokumen	
3.	Dalam pembuatan gudang handak dan penggunaannya harus mengacu kepada peraturan perundang-undangan yang berlaku. Kepmen 555.K/26/M.PE/1995 tentang Keselamatan dan Kesehatan Kerja Pertambangan Umum.	Bab I	Sudah diakomodasikan dalam dokumen	
4.	Hendaknya data yang digunakan untuk kondisi rona awal adalah data yang diambil beberapa tahun sebelumnya, seperti data suhu dan kelembapan udara (Tabel 2-3), dari keterangan sumber bahwa data diambil pada januari-desember tahun 2016 sedangkan sekarang baru sampai bulan september 2016.	Bab II	Sudah diakomodasikan dalam dokumen	
5.	Data kualitas udara pada Tabel 2-4 dan tabel titik kebuanan 2-5, serta Tabel 2-8 hendaknya ditambahkan keterangan kecamatan dan kabupaten karena dibeberapa lokasi terdapat nama desa yang sama dalam dua kabupaten.	Bab II	Akan ditambahkan	
6.	Frekuensi pemantauan lingkungan harus cukup agar tersedia data yang representatif untuk parameter yang dipantau.	RKL-RPL	Terima kasih atas sarannya	
7.	Pemantauan harus dilaksanakan oleh tenaga terlatih yang mengikuti pelatihan pemantauan, tata cara pencatatan, dan menggunakan peralatan yang dikalibrasi dan dipelihara secara layak.	RKL-RPL	Terima kasih atas sarannya	
8.	Pemantauan data harus dianalisis dan ditinjau pada interval rutin dan dibandingkan dengan standar operasi sehingga dapat diambil tindakan perbaikan yang diperlukan.	RKL-RPL	Terima kasih atas sarannya	
Q	Ir. H. Zulkarnain Bachtiar, MT (BLH Kabupaten Muara Enim)			
1.	Status studi ANDAL pada narasi tertulis Penyusunan KA-ANDAL. Karena saat ini sudah proses ANDAL dicantum diganti dengan ANDAL RKL-RPL.	1-1	Telah diperbaiki	
2.	Tabel 1-2 kegiatan penting yang tercantum dalam dokumen KA-ANDAL. Agar KA-ANDAL diganti menjadi ANDAL, RKL-RPL.	1-2	Telah diperbaiki	
3.	Baris ke-4 tertulis...Perda o. 18 Tahun 1992. Agar diganti dengan Perda No. 13 Tahun	1-3	Telah diperbaiki	

NO.	MASUKAN	HAL	TANGGAPAN	HAL
	2012.			
4.	Peta 1.7 Rencana Lokasi PLTP Rantau Dedap Pada peta belum tergambar lokasi WKP dan jalan akses sepanjang 52,5 km dari Kabupaten Lahat ke lokasi. Agar lokasi WKP ditampilkan pada peta, begitu juga jalan akses.	1-43	Telah dicantumkan jalan akses sejauh 52,5 km	
5.	Melakukan pendataan kondisi rumah dan tempat tinggal/bangunan/fasilitas yang ada disekitar lokasi kegiatan sebelum pelaksanaan kegiatan.		Terima atas sarannya	
6.	Menjaga hubungan baik dengan masyarakat sekitar, meminimalisir dampak negatif yang diperkirakan timbul dan seluruh aktivitas tidak mengganggu kegiatan masyarakat seperti persawahan, kebun kopi dan lain-lain sehingga tidak terjadi konflik dengan masyarakat.		Terima atas sarannya	
7.	Melaksanakan sosialisasi kepada masyarakat yang diperkirakan terkena dampak sebelum melakukan kegiatan.		Terima kasih atas sarannya	
8.	Memelihara dan memperhatikan sungai, anak sungai atau daerah tangkapan air lainnya karena lokasi kegiatan berada di lokasi yang merupakan daerah tangkapan air dan berada di bagian hulu Kabupaten Muara Enim.		Terima kasih atas sarannya	
9.	Lokasi wellpad yang baru L, M, N, X dan wellpad B, C, E, I pada tabel agar dicantumkan lokasi masing-masing wellpad berada di Kabupaten/kota mana (apakah di Kabupaten Muara Enim, Kabupaten Lahat atau Kota Pagar Alam).		Akan ditambahkan	
10.	Disnaker → Disnakertrans.	RKL	Telah diperbaiki	
11.	Bab V Surat pernyataan Mengingat saat ini masih dapat proses penilaian ANDAL RKL-RPL kiranya surat pernyataan diganti bulan Oktober saja.	RKL	Telah disesuaikan	
R	Desfa. G (Bappeda Kabupaten Muara Enim)			
1.	Perda No 13 Tahun 2012 tetang RTRW Kabupaten Muara Enim 2012-2032.	1-3	Telah disesuaikan	
2.	PT. SERD tidak ada kontribusi dalam bentuk CSR kepada masyarakat sekitar dan tidak pernah melaporkan kegiatan CSRnya ke sekretariat CSR PKBL Kabupaten Muara Enim yang berkedudukan di Jl. Jend. A. Yani No. 16 Muara Enim.		PT SERD telah memberikan kontribusi terhadap masyarakat sekitar seperti melakukan perbaikan beberapa masjid, perbaikan drainase, perbaikan jalan, dll. Dalam tahap produksi, kegiatan CSR akan dilakukan dengan berkoordinasi dengan instansi terkait.	
S	Gusti Nirwana Farza (BLH Provinsi Sumatera Selatan)			
1.	Terkait titik koordinat.	1-9 Tabel 1-3	Lihat peta I-7	
2.	Tata letak koordinat.	1-10 Tabel 1-4	Lihat peta I-7	
3.	Lengkapi dengan gambar.	1-13 Tabel 1-5	Peta lokasi dapat ditemukan pada peta I-7	
4.	Hasil pengukuran kualitas VA → disandingkan dengan BM untuk parameter TSP dalam laporan hasil uji oleh Laboratorium Kehari menampilkan waktu sampling 1	2-7 Tabel 2-6	Pengukuran TSP yang dilakukan 24 jam untuk lokasi-lokasi tertentu.	

NO.	MASUKAN	HAL	TANGGAPAN	HAL
	jam SNI 1971.193.2005 dimana metode tersebut waktu mengambilnya 24 jam, jadi untuk nilai TSP tidak dapat dibandingkan dengan BM karena hasil pengukuran tidak merensetatif. Pengukuran kualitas UA parameter TSP hanya diambil 24 jam.			
5.	Hasil emisi gas H ₂ S 342 mg/NM ³ melebihi BM 35 mg/NM diakumulasi untuk 30 hari. Paparan hanya 16,5 kg yang masih jauh dari hasil akumulasi 1 tahun 20 kg. Sehingga diberlakukan NAB yaitu 730 kg/NM ³ kalau dikonversikan nilainya pun tetap diatas ambang batas (<20 mg/NM ³). Bagaimana dengan dampak terhadap tenaga kerja yang terkena paparan.	1-38	<p>Lapangan Rantau Dadap menggunakan AFT (Atmospheric Flash Tank) dengan efisiensi flashing antara 50 - 80% untuk mengantikan Rock Muffler yang memiliki efisiensi flashing lebih rendah.</p> <p>Suatu sumur dapat saja mencapai kondisi ekstrim sesaat dengan kadar H₂S = 14% manakala kadar NCG rendah. Namun kadar H₂S rata-rata untuk HP steam adalah sekitar 6,7%. Oleh karena itu angka 14% tidak digunakan dalam perhitungan ANDAL.</p> <p>Perhitungang emisi gas H₂S pada saat uji produksi berdasarkan data Tabel 1-15. Komposisi Kimia Fluida Reservoir. Pada saat uji produksi, emisi H₂S sumur RD-I1 = 246 mg/Nm³ sedangkan sumur RD-I2 = 342 mg/Nm³, jika efisiensi flashing AFT sebesar 80% artinya ada 20% steam lolos ke atmosfer. Emisi ini merupakan nilai maksimum, padahal kenyataan lapangan tentu tidak demikian. Efisiensi flashing AFT hanya sekitar 50%, sehingga ada 50% steam yang lepas ke atmosfer yang akan mengembun pada suhu 46 oC.</p> <p>Dengan efisiensi AFT sebesar 50% atau terjadi steam lepas ke atmosfer sebesar 50%, maka emisi gas H₂S pada saat uji produksi HP steam menjadi 866 mg/Nm³. Beban emisi H₂S untuk paparan kontinu selama 10 hari masih lebih kecil dari Baku Mutu emisi untuk paparan kontinu selama 1 tahun.</p> <p>Gas H₂S yang keluar dari AFT melalui stack setinggi 5 m akan tersebar di dalam lingkungan kerja, yang jauh berada di bawah ambang batas NAB lingkungan kerja , yakni 1.309 µg/Nm³, bukan 730 µg/Nm³.</p> <p>Selama uji produksi 3 – 5 operator petugas uji dilengkapi dengan masker gas H₂S dan di lokasi uji dipasang H₂S detector sehingga praktis sebaran gas H₂S tidak berdampak terhadap karyawan.</p>	

NO.	MASUKAN	HAL	TANGGAPAN	HAL
T	Joko Purnomo (Bappeda Provinsi Sumatera Selatan)			
1.	Diharapkan menambah kajian mengenai dampak penyerapan karbon yang hilang akibat pembangunan PLTP beserta arahan mitigasi dan adaptasinya.		Tidak termasuk dalam kajian studi AMDAL	
2.	Menambahkan informasi terhadap hasil berita acara rapat tim teknis tanggal 27 September 2016 pada angka 2 huruf c disampaikan bahwa status RTRW Provinsi Sumatera Selatan Tahun 2016-2036 telah mendapatkan evaluasi dari Menteri Dalam Negeri dan sedang dilakukan penyempurnaan kemudian akan disampaikan kembali ke Dirjen otda Kementerian Dalam Negeri untuk memperoleh nomor registrasi.		Terima kasih atas informasinya	
3.	<p>Kesesuaian lokasi kegiatan dengan tata ruang</p> <ul style="list-style-type: none"> • Tidak jelasnya ketekidan dalam penjelasan pada tulisan "Rencana Tata Ruang Wilayah Provinsi Sumatera Selatan telah ditetapkan dalam Perda Provinsi Sumatera Selatan No. 14 Tahun 2006, yang dipakai sebagai acuan di alam Tata Ruang Kabupaten dan Kota" dengan substansi dokument ANDAL dan RKJ-RPL ini. • Belum disebutkan mengenai mendapat rekomendasi pengarahan pemanfaatan ruang dari Ketua BKPRD Provinsi Sumatera Selatan sesuai nomor: 050/2622/Bappeda/2016 tertanggal 9 September 2016. • Terdapat kesalahan penulisan pada "Rencana Tata Ruang Wilayah (RTRW) Kabupaten Muara Enim yang berdasarkan Peraturan Daerah No. 18 Tahun 1992", perlu klarifikasi karena yang digunakan sebagai pedoman adalah Perda No: 13 Tahun 2012. Tidak dijelaskan secara detail mengenai kesesuaian terhadap rencana tata ruangnya (struktur ruang, pola ruang dan ketentuan zonasinya). • Dasar pertimbangan untuk wilayah Kota Pagar Alam juga salah (Perda No. 14 Tahun 2013) mengingat perda yang digunakan sebagai pedoman adalah No. 7 Tahun 2012 dan tidak dijelaskan secara detil mengenai kesesuaian terhadap rencana tata ruangnya (struktur ruang, pola ruang dan ketentuan zonasinya). • Tidak dilengkapi rekomendasi pengarahan pemanfaatan ruang dari Pemerintah Kabupaten Lahat. 	1-3	<p>Akan disesuaikan</p> <p>Data RTRW Lahat dan Pagar Alam ditunggu dari Pak Goerill</p>	
2.	<ul style="list-style-type: none"> • Tidak dijelaskan mengenai letak kecamatan pada Kabupaten Muara Enim dan Kabupaten Lahat. • Perlu diperjelas mengenai perbedaan letak desa dengan wilayah desa pada Kota Pagar Alam karena ada sekitar 3 pusat desa/kelurahan yang berdekatan dengan WKP PLTP. 	1-85	Batas administrasi telah di masukkan dalam dokumen ANDAL	
3.	Belum mengakomodir kajian mengenai resiko terhadap potensi bencana alam seperti gerakan tanah atau longsor.		Telah ditambahkan	
4.	Tidak dilampirkannya pertimbangan teknis dari instansi teknis lainnya (Dinas Kehutanan atau BPKH dan Dinas Pertambangan dan Energi).		Tidak diperlukan pertimbangan dari BPKH dan Dinas Pertambangan dan Energi dan Kehutanan	
5.	<ul style="list-style-type: none"> • Tidak dilampirkannya peta pertimbangan teknis dari Pemerintah Kabupaten Lahat dan Kota Pagar Alam. • Tidak dilampirkannya peta penggunaan lahan eksisting paling tidak 2 tahun 		Data RTRW oleh Pak Goerill	

NO.	MASUKAN	HAL	TANGGAPAN	HAL
	terakhir.			
U	Lukman Hakim Alamsyah Jaya (Ketua LSM Laskar Hijau Kabupaten Lahat)			
1.	2.1.3.1 Sosial Ekonomi 2.1.3.1.2 Kependudukan 3 Demografi Kecamatan Semendo Darat Ulu (SDU) dan Kota Agung. Paragraf ke 2 baris 4 dan 5 yang menyatakan "Angka Rasio yang Relatif rendah terdapat di gampong-gampong ulee jalan, Bathupat Timur dan Blang Pulo". Apa yang dimaksud dengan "gampong-gampong ulee jalan, Bathupat Timur dan Blang Pulo"? Tidak ada desa dan/atau dusun di Kecamatan Kota Agung Kabupaten Lahat yg memiliki nama seperti diatas.		Sudah dikoreksi.	
2.	Tabel 2-36 Komposisi Penduduk Berdasarkan Kelompok Umur dan Jenis Kelamin Kecamatan SDU dan Kec. Kota Agung 2015. Hal. 2-77 (sumber data: BPS Kecamatan Kota Agung dalam Angka 2016) Jumlah total Penduduk Kecamatan Kota Agung Kabupaten Lahat sebanyak 12.618 pada Tabel 2-36. Namun jumlah tersebut tidak sama dengan jumlah penduduk yang tercantum pada tabel 2-35 "Jumlah Penduduk, Rasio Gender dan Kepada Lalu Peneluk per Desa Kecamatan Kota Agung 2015" hal 2-76 disebutkan jumlah total penduduk sebanyak 12.755		Koreksi sumber : BPS, Statistik Daerah Kecamatan Kota Agung BPS, Statistik Daerah Kecamatan SDU Jumlah penduduk sudah dikoreksi	
3.	2.1.3.4 Sikap dan Persepsi Masyarakat Sesuai dengan hasil kuisioner yang menyatakan sebesar 76% masyarakat menyetujui rencana kegiatan ini. Maka dapat disimpulkan berdasarkan uraian pada 2.1.3.4 sikap setuju masyarakat tersebut dengan catatan bila terjadi hubungan yang baik antara masyarakat dan perusahaan. Dari uraian 2.1.3.4 kami menangkap bahwa masyarakat menyimpan harapan agar sekiranya perusahaan dapat memajukan kehidupan masyarakat dengan cara memberikan bantuan seperti -mesin penggiling kopi, -membantu masyarakat dalam membentuk kelompok usaha, -mengadakan pelatihan dalam bidang industri rumah tangga, -menyerap tenaga kerja lokal, dan memperhatikan kesehatan masyarakat dan lain-lain.		Hubungan baik bisa juga karena dengan sikap (<i>manner</i>) disertai dengan karakter yang baik dari <i>Relation Officer</i> PT SERD dengan masyarakat.	
4.	3.1.2.3 Gangguan Transportasi Hal 3-8 s/d 3-9. Dalam tabel baris pertama Besarnya Jumlah penduduk yang akan terkena dampak rencana usaha. Kriteria dampak Tidak Penting (TP). Berdasarkan uraian dalam kolom 3 jumlah manusia yang terkena dampak adalah masyarakat Desa Kota Agung hingga lokasi kegiatan maka tidak relevan jika Kriteria dampak yang diperkirakan adalah Tidak Penting (TP), seharusnya kriteria dampak Negatif Penting (-P) mengingat dampak tersebut langsung diterima oleh masyarakat.		Jumlah penduduk yang terkena akibat mobilisasi peralatan dan material, hanya sebagian kecil dan dampak yang ditimbulkan tidak akan signifikan terhadap volume lalu lintas yang ada.	
5.	Baris ke 2 Luas Wilayah Persebaran Dampak. Kriteria Dampak Tidak Penting (TP) Berdasarkan urai dalam kolom 3 persebaran dampak pada perkampungan yang akan dilalui, berdasarkan uraian dalam 2.1.4.2 Volume lalu lintas paragraf 2 baris terakhir yang menyatakan bahwa terdapat pemukiman di kiri kanan jalan dan manfaat yg positif yang dirasakan oleh masyarakat akibat dari perbaikan jalan kemudian pada paragraf ke 5 yg menyatakan adanya jam-jam sibuk aktivitas masyarakat dan pada paragraf ke 6 yg menyatakan adanya aktivitas ekonomi masyarakat pengguna jalan		Kajian Dampak lalu lintas yang diakibatkan oleh mobilisasi peralatan dan material merupakan dampak tidak penting (TP), karena kondisi lalu lintas tergolong lengang dan lancar. Kondisi TC-1 merupakan lokasi dengan volume jam puncak tertinggi (PHV) yaitu 63-70 kendaraan dalam 1 jam.	

NO.	MASUKAN	HAL	TANGGAPAN	HAL
	<p>baik itu dengan kendaraan roda 2 dan roda 4. Maka mengingat akan tumbuhnya ekonomi masyarakat dari tahapan kegiatan penerimaan tenaga kerja lokal yang mengakibatkan tumbuhnya ekonomi masyarakat dan pola konsumtif masyarakat dapat diperkirakan jumlah kendaraan pengguna jalan akan mengalami peningkatan. mengingat masa konstruksi akan berlangsung selama kurang lebih 3 tahun maka dampak yang diprediksikan seharusnya negatif penting (-P).</p> <p>Berdasarkan analisa kami diatas maka sepatutnya dampak gangguan transportasi menjadi dampak negatif penting (-P).</p>		Dalam uraian penyerapan tenaga kerja disebutkan bahwa jumlah yang akan diserap mencapai 2.110 orang (Tabel 1-8), akan tetapi jumlah tersebut tidak sekaligus dipenuhi, tetapi akan bertahap sesuai dengan kebutuhan, sesuai jadwal pelaksanaan (Tabel 1-25), tahap konstruksi akan berlangsung selama ± 2 (dua) tahun.	
6.	<p>3.2.1.3 Perubahan Pendapatan Masyarakat Hal 3-29 s/d 3-30 kategori dampak Positif Penting (+P)</p> <p>Kesimpulan kategori dampak menjadi positif penting sama sekali tidak tergambar dalam uraian.</p>		Uraian telah diperbaiki sesuai saran.	
V	Eddy Subandri (LSM Lingkungan Sekundang)			
1.	Kepada pihak pemrakarsa dalam hal ini PT. SerD untuk dapat melaksanakan RKL-RPL dengan sebenar-benarnya dan diimplementasikan dalam kegiatan pengusahaan panas bumi tersebut.		Terima kasih atas sarannya	
2.	Isu global warning.		Terima kasih atas sarannya	
3.	Jangan sampai terjadi istilah "Tikus mati di lahan padi" (menyangkut kesejahteraan masyarakat).		Terima kasih atas sarannya	
4.	Harus memperhatikan konflik sosial terutama masalah tenaga kerja lokal.		Terima atas sarannya	
W	Yarman Sohar (Camat Dempo Selatan)			
1.	Kawasan hutan lindung untuk wilayah Kota Pagar alam betul-betul masih baik dan jangan sampai ada perusakan hutan/hilangnya ekosistem yang ada.		Terima kasih atas informasi dan sarannya	
2.	Saran untuk Kelurahan Pagar Alam diberikan pelatihan yang berbentuk sosial atau tenaga kerja atau lainnya, walaupun Kota Pagar Alam jauh dengan penduduk tapi disana wilayah Kelurahan Penjalang.		Terima kasih atas informasi dan sarannya	
3.	Antisipasi pencemaran sungai.		Terima kasih atas informasi dan sarannya	
X	Eddy Mulyadi (BPKH Wilayah II Palembang)			
1.	Pada areal pinjam pakai kawasan hutan segera lakukan penataan batas dengan berkoordinasi dengan Direktorat Pengukuhan Hutan, BPKH Wilayah II Palembang dan Dinas Kehutanan Provinsi Sumatera Selatan.		Terima kasih atas informasi dan sarannya	
2.	Melaksanakan rehabilitasi DAS.		Akan dilaksanakan sesuai dengan mekanismenya	
3.	Pada kawasan hutan lindung agar tetap terjaga fungsi tata air dan menghindari erosi/longsor.		Terima kasih atas informasi dan sarannya	
4.	Pembukaan jaringan jalan agar tidak open akses yang dapat mengakibatkan terjadinya perambahan kawasan hutan oleh masyarakat sekitar usaha perlu pengawasan yang ketat dan menbatasi dengan portal-portal/pos-pos penjagaan.		Terima kasih atas informasi dan sarannya	
5.	Segara menyusun base line pada areal izin pinjam pakai kawasan hutan untuk pembayaran PNBP-PKH.		Akan dilaksanakan sesuai dengan mekanismenya	

NO.	MASUKAN	HAL	TANGGAPAN	HAL
6.	Pembayaran PNBP-PKH dilakukan setiap sebelum jatuh tempo yaitu ulang tahun tanggal izin pinjam pakai kawasan hutan.		Akan dilaksanakan sesuai dengan mekanismenya	
7.	Melaksanakan pemotretan lokasi setiap tahun dalam bentuk citra resolusi sangat tinggi.		Akan dilaksanakan sesuai dengan mekanismenya	
8.	Perlu penyiapan unit pencegahan dan pengendalian kebakaran hutan dan lahan mengingat Sumatera Selatan termasuk wilayah yang rawan kebakaran.		Akan dilaksanakan sesuai dengan mekanismenya	
Y	Alfi Fahmi (PPE Sumatera)			
1.	Agar dilengkapi data/jumlah penggunaan air pada tahap konstruksi dan operasi baik untuk keperluan karyawan maupun operasi kegiatan termasuk sumber air tersebut dari mana.	Deskripsi kegiatan	Sudah ada dalam dokumen ANDAL	
2.	Sebelum menguraikan lebih lanjut tentang prakiraan dampak penting, sebaiknya dilengkapi dengan matrik atau bagan identifikasi dampak potensial sampai didapatkannya Dampak Penting Hipotetik yang dikaji dalam dokumen ini	Perkiraan Dampak Penting (BAB III)	Sudah ada dalam dokumen ANDAL	
3.	Agar lokasi pengelolaan dan pemantauan kualitas air sudah bisa dipastikan titiknya. Lokasi tsb sebaiknya juga dicantumkan dalam peta pengelolaan dan pemantaua. Dalam dokumen RKL-RPL lokasinya masih belum jelas.	RKL-RPL	Sudah ada dalam dokumen ANDAL	
4.	Pengelolaan dan pemantauan emisi, mengacu kepada Kepmen LH No 21 tahun 2008 (lampiran V), jadi yang dikelola dan dipantau tidak hanya parameter H2S tetapi juga Amonia.	RKL-RPL	Sudah ada dalam dokumen ANDAL	
5.	Matrik RKL-RPL belum menguraikan tentang pengelolaan dan pemantauan dampak yang tidak dikaji, tetapi dikelola dan di pantau seperti pengelolaan limbah B3 yang dihasilkan baik dalam tahap kontruksi maupun pada tahap operasi. Pengelolaan Limbah B3 ini agar dimasukkan dalam tabel RKL-RPL	RKL-RPL	Telah ditambahkan mengenai pengelolaan dan pemantauan limbah B3	

Daftar Undangan

Jakarta

1. Ketua Komisi AMDAL Kementerian Lingkungan Hidup

Provinsi Sumatera Selatan

2. Kepala Badan Lingkungan Hidup (BLH), Provinsi Sumatera Selatan
3. Kepala Dinas Energi dan Sumber Daya Mineral, Provinsi Sumatera Selatan
4. Kepala Badan Perencanaan dan Pembangunan Daerah (BAPPEDA), Provinsi Sumatera Selatan
5. Kepala Dinas Kehutanan Provinsi, Sumatera Selatan

Kabupaten Muara Enim

6. Kepala Badan Lingkungan Hidup (BLH), Kabupaten Muara Enim
7. Kepala Badan Perencanaan dan Pembangunan Daerah (BAPPEDA), Kabupaten Muara Enim
8. Kepala Dinas Energi dan Sumber Daya Mineral, Kabupaten Muara Enim
9. Kepala Dinas Kehutanan, Kabupaten Muara Enim
10. Kepala Polres Kabupaten Muara Enim
11. Komandan Kodim 0404 Kabupaten Muara Enim
12. Camat Simende Darat Ulu, Kabupaten Muara Enim
13. Kepala Desa Segamit, Kecamatan Semende Darat Ulu, Kabupaten Muara Enim
14. Ketua BPD Segamit, Desa Segamit, Kecamatan Semende Darat Ulu, Kabupaten Muara Enim
15. Perwakilan tokoh Masyarakat Desa Segamit, Kecamatan Semende Darat Ulu, Kabupaten Muara Enim

Kabupaten Lahat

16. Kepala Badan Lingkungan Hidup (BLH), Kabupaten Lahat
17. Kepala Badan Perencanaan dan Pembangunan Daerah (BAPPEDA), Kabupaten Lahat
18. Kepala Dinas Energi dan Sumber Daya Mineral, Kabupaten Lahat
19. Kepala Dinas Kehutanan, Kabupaten Lahat
20. Camat Kota Agung, Kabupaten Lahat
21. Kepala Desa Suka Rame, Kecamatan Kota Agung, Kabupaten Lahat
22. Kepala Desa Karang Endah, Kecamatan Kota Agung, Kabupaten Lahat
23. Kepala Desa Pandanarang, Kecamatan Kota Agung, Kabupaten Lahat
24. Kepala Desa Tunggul Bute, Kecamatan Kota Agung, Kabupaten Lahat
25. Kepala Desa Lawang Agung, Kecamatan Kota Agung, Kabupaten Lahat
26. Kepala Desa Singapore, Kecamatan Kota Agung, Kabupaten Lahat
27. Kepala Desa Mutar Alam, Kecamatan Kota Agung, Kabupaten Lahat
28. Ketua BPD Suka Rame, Desa Suka Rame, Kecamatan Kota Agung, Kabupaten Lahat
29. Ketua BPD Karang Endah, Desa Karang Endah, Kecamatan Kota Agung, Kabupaten Lahat
30. Ketua BPD Pandan Arang, Desa Pandanarang, Kecamatan Kota Agung, Kabupaten Lahat
31. Ketua BPD Tunggul Bute, Desa Tunggul Bute, Kecamatan Kota Agung, Kabupaten Lahat
32. Ketua BPD Lawang Agung, Desa Lawang Agung, Kecamatan Kota Agung, Kabupaten Lahat

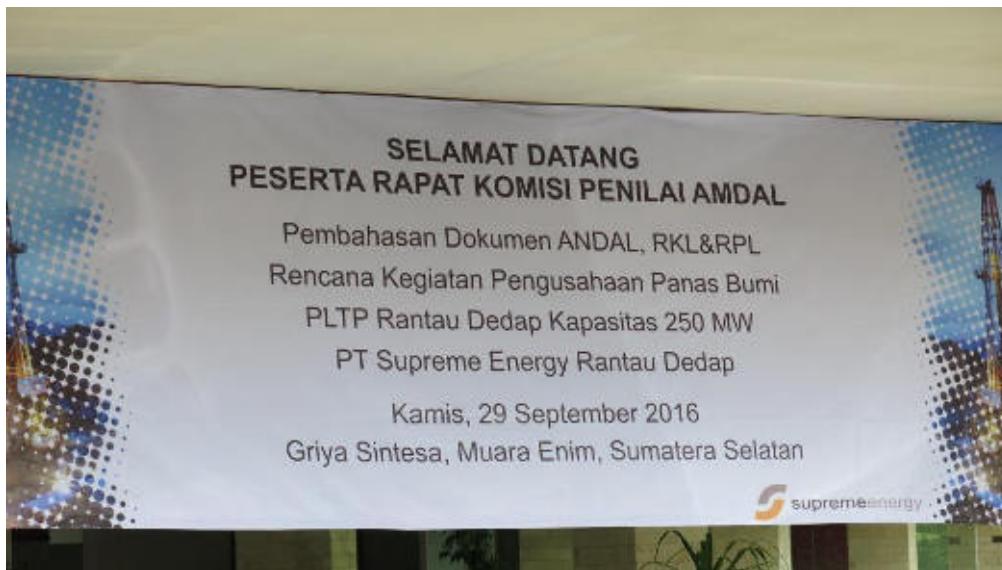
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33. Ketua BPD Singapore, Kecamatan Kota Agung, Kabupaten Lahat
34. Ketua BPD Mutar Alam, Kecamatan Kota Agung, Kabupaten Lahat
35. Perwakilan tokoh Masyarakat Desa Suka Rame, Kecamatan Kota Agung, Kabupaten Lahat
36. Perwakilan tokoh Masyarakat Desa Karang Endah, Kecamatan Kota Agung, Kabupaten Lahat
37. Perwakilan tokoh Masyarakat Desa Pandan Arang, Kecamatan Kota Agung, Kabupaten Lahat
38. Perwakilan tokoh Masyarakat Desa Tunggul Bute, Kecamatan Kota Agung, Kabupaten Lahat
39. Perwakilan tokoh Masyarakat Desa Lawang Agung, Kecamatan Kota Agung, Kabupaten Lahat
40. Perwakilan tokoh Masyarakat Desa Singapure, Kecamatan Kota Agung, Kabupaten Lahat
41. Perwakilan tokoh Masyarakat Desa Mutar Alam, Kecamatan Kota Agung, Kabupaten Lahat
42. Kepala Polsek Kota Agung, Kabupaten Lahat
43. Komandan Koramil Kota Agung, Kabupaten Lahat
44. Lembaga Swadaya Masyarakat (LSM) Pelestarian Alam Indonesia

Kotamadya Pagar Alam

45. Kepala Badan Pengelolaan Lingkungan Hidup (BPLH), Kota Pagar Alam
46. Kepala Badan Perencanaan dan Pembangunan Daerah (BAPPEDA), Kota Pagar Alam
47. Kepala Bahagian Sumber Daya Alam (SDA), Kota Pagar Alam
48. Kepala Dinas Kehutanan, Kota Pagar Alam
49. Camat Dempo Selatan, Kota Pagar Alam
50. Lurah Penjalang dan Lurah Kasihdiwe, Kecamatan Dempo Selatan, Kota Pagar Alam
51. Perwakilan Tokoh Masyarakat Kelurahan Penjalang dan Kelurahan Kasihdiwe, Kecamatan Dempo Selatan, Kota Pagar Alam
52. Kepala Polsek Dempo Selatan, Kota Pagar Alam
53. Komandan Koramil Dempo Selatan, Kota Pagar Alam
54. Lembaga Swadaya Masyarakat (LSM) Serasan Sekundang

Catatan : Oleh karena lokasi Kelurahan Penjalang dan Kelurahan Kasihdiwe sulit / jauh, maka disarankan agar undangan disampaikan saja melalui Camat Dempo Selatan (Sdr.Yusman).



DAFTAR HADIR

NAMA RAPAT : Rapat Komisi Pembahasan Dokumen ANDAL, RKL-RPL Rencana Kegiatan Pengutahan Pemas Bumi untuk PCTP Rantau Dedap dg Kapasitas 250 MW (Pergeseran Lokasi Power Plant dan Penambahan Tapak Pemboran) yang berlokasi di kab. Muara Enim, Kab. Lahat dan Kota Pagar Alam , Prov. SumSel oleh PT. Supreme Energi Rantau Dedap.

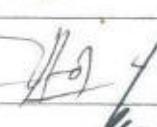
TANGGAL : Kamis , 29 September 2016

NO.	NAMA	JABATAN/INSTANSI	ALAMAT/TELEPHONE	PROVINSI/KAB. KOTA	TANDA TANGAN
1.	EDDY SUBANDRI	SEKRETARIS / LSM LIANGKUNSA	MUARA ENIM / 0813 6700.8230	Muara Enim	
2.	Joko Purnomo	staf Bappede Sumsel	0813 6771 6879		
3.	Syahrimi	KBKG Perencanaan Dikhubkominfo Prov. Sumsel	085273919278	Provinsi Sumsel	
4.	Indra Lukman	(Dishut) Kasi perencanaan inter Kasubsi Penanaman kawasan lingkungan / BPLH	085380132121	Muara Enim	
5.	Jauhari, ST	Kasubbag Pengelolaan SDA / Bagian Adm. Sumber Daya Alam	081393272 495	Pagar Alam	
6.	Febrilyanti, ST	Kasubbag Pengelolaan SDA / Bagian Adm. Sumber Daya Alam	0813 - 733 00029	Kota Pagar Alam	
7.	Andi Yukinson, ST	Kasubbag Penggalian Potensi EDA	08127212 0467	Kota Pagar Alam	
8.	Ahmad Zegi Yamali, ST	Kasubbag SDA, LHK. Dan Tbk Ruang Bappeda Kab. Pagar Alam	0812 7129 9725	Kota Pagar Alam	
9.	Hendri Dinata, ST, MT	Staf Pemas Bumi Distamben Nit	0852-7369-9899	Muara Enim	
10.	Desfa G.	Bappeda KAB. Muar Enim 085283628700	Muar Enim / 085283628700	Kab. Mu. Enim	

DAFTAR HADIR

NAMA RAPAT :

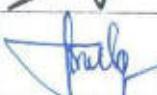
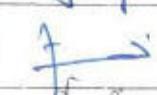
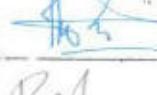
TANGGAL :

NO.	NAMA	JABATAN/INSTANSI	ALAMAT/TELEPHONE	PROVINSI/KAB. KOTA	TANDA TANGAN
1.	Mhd. Tarsuman, S.Sos, M.Si	Sekretaris Camat Sari	Desa Rajar Bulan	Meur Eni	
2.	Ida Heriyanti, BA	Kasi. Bimtek dan Pembering Pertamb. Lahat	Pertamb. Lahat - Kab Lahat	Lahat	
3.	NURQUTNI, ST, M.Si	Bappoda Lahat	Lahat	Lahat	
4.	Ir. Maulardi	Dishubzn Lahat	Lahat	Lahat	
5.	H. Mujahidin	Dishubzn Lahat	Lahat	Lahat	
6.	Himanwan Sufanto, A.Md	Dishubzn P. Alam	Rajor Alm.	Rajor Alm	
7.	Ir. Jerry Gunawan	DISITUB ME	Terminal Regional ME	ME	
8.	MUHLIS,S.Ag,S.E,M.Si.	Dikti Lahat	Jl. Bojokon	Lahat	
9.	H. UBAIDILLAH, S.Km, M.Kes	Dinas Kesehatan Kab. Lahat	Jl. Banyaknara - Lahat	Lahat	
10.	JONI APRIADI,SE	Dishubkominfo Cabor Operator	Jl. Banyaknara - Kab. Jaya Lah. 101132120	LAHAT	

DAFTAR HADIR

NAMA RAPAT : Rapat Komisi Pembaharuan Dokumen ANPDL, RKL - RPL Rancana Kegiatan Pengusahaan Pemas Bumi, untuk PLTP Rantau Pedas dengan Kapasitas 250 MW (Pengeseran Lokasi Power Plant dan Renambahan Tapal Pemboran) yg berlokasi di Kabupaten Muara Enim, Kab. Lahat dan Kota Pagar Alam oleh PT. SERD.

TANGGAL : Kamis, 29 September 2016

NO.	NAMA	JABATAN/INSTANSI	ALAMAT/TELEPHONE	PROVINSI/KAB. KOTA	TANDA TANGAN
1.	Zulkarnain Bachtiar	KABLH MUARA ENIM	JL. TJIKA GUS KIEYAS	MUARA ENIM	
2.	HT. SUKAYA .	Dinas PU Bina Marga dan Pengairan Ma. Enim	Jl. Jend. A. Yani no 20 Muara Enim	MUARA ENIM	
3.	A. Dani , ST	- sda -	- sda -	- sda -	
4.	Ulkman Hakim Alamsyah Jay	USM Laskar Hijau / ketua	JL. Let. Alamsyah no.70	Lahat	
5.	NUNUNG RAHMAWATI , SKM	Dinas Kesehatan	JL. DR. AK. GANI MUARA ENIM	MUARA ENIM	
6.	KOMARIYAH. SKM	DINAS KESEHATAN PAGAR ALAM	JL. AIS NASUTION NO.01	PAGAR ALAM	
7.	BOBY. IRAWAN S.Sos	Kec Dempo Selatan kota Pagaralam	Jl. Pagashlam - Lahat	PAGAR ALAM	
8.	Dwi Sriyanningsih, SE	Lurah Kandang Biwe Kec. Dempo Selatan kota Pagaralam	Pagaralam.	Pagaralam.	
9.	Candra Wigyo. Jr	Jl. Bago Pengalan Kec. Bago Selatan P.M	Pagar Alam.	Pagar Alam.	
10.	Yusman Dahr, SE	Candi O.P.	Ps. Banting	Pagan Alam	

DAFTAR HADIR

NAMA RAPAT :

TANGGAL :

NO.	NAMA	JABATAN/INSTANSI	ALAMAT/TELEPHONE	PROVINSI/KAB. KOTA	TANDA TANGAN
1.	Ayo Kalimantan	K. BPLH	082188820078	Pays Alai	
2.	HETTYKA	BPH. Lahat (Staff)	-	BPH. Lahat	
3.	HRIVITA Putri	BPH. Lahat (Staff)	-	BPH. Kab. Lahat	
4.	Lery Resarianti	Kabid Pengawaran Bumdes Lingkungan	0811735905	BPH Kab. Lahat	
5.	M. NAWWI	KADES	SUKARANI	LAHAT	
6.	SAFRRI	KADES	CHAWANG - Abung	LAHAT	
7.	IMAM PRIBADI	KADES	VIARANG - L. MIAH	LAHAT	
8.	Gusti Nirwana Farza	KS. Bid. Tata Lingkung. BPKH. BPH Prov. Sumsel	082181290291	BPH Provinsi Sumatera Selatan	
9.	EDDY Mulyadi	BPKH II Palencong	081367257613	BPKH Provinsi	
10.	M. El Nurla S	BPKH II Paledang	08117114969	BPKH Provinsi	

DAFTAR HADIR PEMERAKARSA

NAMA RAPAT :

TANGGAL :

NO.	NAMA	JABATAN/INSTANSI	ALAMAT/TELEPHONE	PROVINSI/KAB. KOTA	TANDA TANGAN
1.	BIMA YUDHISTIRANTO	PT SERD /SHE	0811458875	JAKARTA	
2.	HERWIUR AZIS	PT SERD	081220193990	Jakarta	
3.	GILANG RIFKI	PT SERD	08112337309	JAKARTA	
4.	FADLIS BARNAJI	PT. SERD	0812 903 9032	Jakarta	
5.	ASHARRY SOFYAN	PT. SERD	0811150995	Jakarta	
6.	YORA JAMAL	PT. SERD	0811 844 9260	Jakarta	
7.	Erwin Guminda	PT. SERD	081289355813		
8.	M. Arief T	PT SERD			
9.	M. Gerinean Dan		0813 1977 3117	Brusel	
10.					

DAFTAR HADIR

KONSULTAN

NAMA RAPAT :

TANGGAL :

NO.	NAMA	JABATAN/INSTANSI	ALAMAT/TELEPHONE	PROVINSI/KAB. KOTA	TANDA TANGAN
1.	RICKY Sulistyo	Anggota Tim	081221239403	JKT	<i>Ricky</i>
2.	Kosasih	Anggota Tim	081586252853	JKT	<i>Kosasih</i>
3.	Henny AT	Ketua	08164800420	JKT	<i>Henny</i>
4.	Lalita Fitrianti	Anggota Tim	081314411521	JKT	<i>Lalita</i>
5.	Rafeldy Noviar	Anggota Tim	081287636368	JKT	<i>Rafeldy</i>
6.	Bauher S-Am	Anggota Tim	081380161880	JKT	<i>Bauher</i>
7.	Rully Armanza	Anggota Tim	08127801817	PJG	<i>Rully</i>
8.	Guntur Pragustiandi	Anggota Tim	082281785373	PJG	<i>Guntur</i>
9.					
10.					

Appendix II

Detailed Minute of Meeting and Participant

Response of Biodiversity Action Plan

Workshop

**BIODIVERSITY ACTION PLAN WORKSHOP AND CONSULTATION
 GEOTHERMAL DEVELOPMENT PT. SUPREME ENERGY RANTAU DEDAP
 GUNUNG PATAH LANDSCAPE, SOUTH SUMATRA PROVINCE
 HOTEL GRAN ZURI, PALEMBANG**
15 MAY 2017

No.	Subject	Questions/Suggestions/Opinions	Response
First Session			
1.	Prof. Hilda Zulkifli (Universitas Sriwijaya, Biology Dept)	a. A huge appreciation is given to this workshop and consultation which is successful in gathering conservation experts of all fields.	Suggestion accepted.
		b. Aquatic biota is still lacking. It should be improved with secondary data. The finding of Ikan Semah in the area is widely appreciated as this is a new discovery for Universitas Sriwijaya.	A study on aquatic biota was carried out during the preparation of UKL-UPL in 2011 and AMDAL Study in 2013 by the UNSRI team, but <i>Semah</i> Fish was not found in the area surrounding the PT. SERD project.
		c. SERD has a large environmental responsibility due to the location of the project which is within Protected Forest boundary.	PT. SERD has an obligation to manage the Forest Zone in accordance with <i>Izin Pinjam Pakai</i> granted by the government
		d. Primary data should be collected since 2014 as it was when the project started.	PT. SERD has UKL/UPL Document primary data in 2011 conducted by Sriwijaya University and AMDAL primary data in 2013 conducted by Sriwijaya University and Greencap Consultant.
		e. Critical habitat assessment (CHA) should be in line with the IBSAP as it is a national document.	CHA is a document that is adapted to meet the standards of the Asian Development Bank, so that the review undertaken not only meets the IBSAP (national standard directives), but is

No.	Subject	Questions/Suggestions/Opinions	Response
			more comprehensive and meets international standards
	f.	Local names should be corrected and improved.	Suggestion accepted.
	g.	Unique ecosystems: Due to the documentation of <i>Rafflesia</i> in the area, the ecosystem in the project area should be reassessed.	From the results of the UKL UPL study, AMDAL, and Biodiversity, the study did not find the existence of <i>rafflesia</i> around the PT. SERD project area, nevertheless whenever the species is found; PT. SERD has already had a standard "Change Find Procedure" for further action.
	h.	Mitigation and monitoring: The mitigation and monitoring methods seem to focus solely on the construction phase Mitigation and monitoring should be implemented in all project phases.	Mitigation and biodiversity monitoring is not only conducted during construction period, but will be conducted as long as PT. SERD project running, starting from pre-construction stage, construction period, operation period and post operation. This is in accordance with the obligations of PT. SERD as stated in the RKL-RPL document.
	i.	Regional documents should also be assessed and referenced in the document as several regencies are involved in the project.	Suggestion is accepted and will be accommodated.
	j.	Any project conducted within the Protected Forest requires an Environmental Permit (AMDAL)	PT. SERD already has UKL UPL document for exploration phase from 2011, which has been approved by Environment Agency of South Sumatera Province. In 2017, PT. SERD has also obtained approval and Environmental Permit from Ministry of Environment and Forestry for preparation of development stage. In addition, PT. SERD has License to conduct geothermal activities within the Protected Forest in accordance with Law No. 21 of 2014 on Geothermal.

No.	Subject	Questions/Suggestions/Opinions	Response
		k. Primary data provided by the company/consultant must be valid to be able to be submitted to the South Sumatra Biodiversity Inventory Network (SSBIN)	The species inventory is conducted with primary and secondary data and has been analyzed by experts and academics so that the data is confirmed valid.
2.	Munawar (Universitas Sriwijaya, Biology Dept)	a. The project area has a high potential to be developed as a Geopark. This can substantially contribute to the regional economy. Conservation and utilization must be maintained to ensure the biodiversity in the project area is preserved.	PT. SERD area in accordance with data and information from the Forest Service is not a 'geopark' status. Assessment and studies on project area areas have been reviewed by the company.
		b. How complete is the company's species inventory? Is there annual biodiversity data of the project area? The acquired data can be submitted to Universitas Sriwijaya to be identified or analyzed further (e.g. modeling).	Inventory of species has been carried out in the UKL-UPL study. Subsequently, regular monitoring has also been conducted and reported on the UKL/UPL report periodically by PT. SERD. The monitoring was carried out several times by PPLH of Sriwijaya University and some monitoring period was implemented by PT Radiant Utama tbk consultant (consultant of PT. SERD from Jakarta).
3.	Adi Kunarso (Palembang Environmental and Forestry R&D Agency)	a. Is the scope of the document comprise the overall landscape of Bukit Jambul or only in the scale of the Discrete Management Unit (DMU)?	The Assessment scope is within the DMU.
		b. Is the study between 2014 and 2016 conducted at the same sampling locations and/or representative of all of the area?	The study was conducted within the perimeter of 1-2 km from the project area by focusing 8 target species. Cameras were installed at random with consideration of ecosystem conditions suitable of the target species. In addition, study was also conducted in locations where traps installed by local hunters were also assessed.

No.	Subject	Questions/Suggestions/Opinions	Response
		<p>c. DMU is recommended to use watershed as natural boundaries.</p> <p>d. Regarding the species in Bukit Jambul, there is one unpublished species which is the Sumatran serow (<i>Capricornis sumatrensis</i>). SERD is advised to conduct primary research and conservation efforts to this rare species because it is believed that SERD may be more resourceful than regional agencies.</p>	<p>The applied DMU utilizes the natural habitat of the Sumatran tiger, forest area, and altitude as boundaries.</p> <p>Primary data collection has been conducted but not focused only on certain species. The study found the presence of mountain goats within the study area. One of the threats to mountain goats is hunting by the people. The BAP has incorporated these efforts by awareness of species targeted by the communities.</p>
4.	Muhammad Iqbal (KPB SOS)	<p>a. <i>Gallinula chloropus</i> and other water birds: regularly spotted at paddy fields and not in high altitude;</p> <p>b. Gelatik bird: rarely found in South Sumatra, except at paddy fields in the project area;</p> <p>c. Semah fish: this may be an assumption; there are several <i>Tor</i> species in the area.</p> <p>d. Flying squirrel: agreed as a discovery yet usually difficult to identify</p>	<p>In the project area there are several water bodies. These species are found on an artificial lake close to the village near the access road.</p> <p>The project area of PT SERD is protected forest, but many areas in the project area have been cleared prior to the project commencement for community gardens.</p> <p>A study on aquatic biota was carried out during the preparation of UKL-UPL in 2011 and an AMDAL Study in 2013 by the UNSRI team, but Semah Fish was not found in the area surrounding PT. SERD project. When in the future the Semah fish are found in the area around the PT. SERD project, the "Change Find Procedure" will be implemented in accordance with the SOP.</p> <p>The study did not find the presence of flying squirrels.</p>

No.	Subject	Questions/Suggestions/Opinions	Response
5.	Erwin Purnomo (Forestry Agency South Sumatra)	a. In response to Prof Hilda's opinion regarding the company's concession as an incorrect output of spatial planning: The spatial plan has been implemented based on the correct code of conduct and has acquired recommendation from the central government. In addition, geothermal concession in Protected Forest is an exception based on the forest moratorium.	This statement is not required to be responded due to the response to the statement and clarification of Prof. Hilda's question.
6.	Bonsen Hendi (Environmental Agency Kota Pagar Alam)	a. Data still requires improvement. It is advised that primary and secondary data are inputted, including data from the regional database that may be more complete.	Secondary data have been used in species inventory, both from district secondary data and from other literatures.
		b. With the establishment of the Forest Management Unit (<i>Kesatuan Pengelolaan Hutan - KPH</i>) and disbandment of the local forestry agency, illegal hunting and poaching has increased in the project area. The provincial government should be more proactive in preventing this.	This statement is not required to be responded due to the input to the Provincial Forestry Office of South Sumatra to proactively combat poaching.
		c. Semah fish: still undecided, several <i>Tor</i> species require further research.	Thank you for the input.
		d. In 2010, the horned toad and Asian golden cat were identified in the project area.	Studies on aquatic biota (including amphibians) were carried out during the preparation of UKL-UPL in 2011 and an AMDAL Study in 2013 by the UNSRI Team, but horn frogs were not found in the area surrounding the PT. SERD project. When in the future the horn frogs are found in the area around the PT. SERD project, the "Change Find Procedure" will be implemented in accordance with the SOP.

No.	Subject	Questions/Suggestions/Opinions	Response
		e. In Kota Pagar Alam, Cawang Kanan River is designed for water resources and irrigation purposes. The establishment of this project can affect the water debit in the downstream. Further research is required to be able to maintain this. f. The regional government is entitled to receiving the study results of the action plans for mitigation purposes in the project area.	This statement is not related to the subject of the biodiversity of the PT. SERD study. The results of biodiversity studies have been reported on the regional government as stated in the UKL-UPL report as well as the AMDAL study as set forth in the RKL-RPL document.
7.	Ade Kusuma (Forum Gajah)	a. It is advised that the company considers the project area as part of the elephant distribution area despite its last documentation in 2004-2005. This is to anticipate future wildlife conflict.	At the time of preparation of UKL-UPL documents in 2011 and the AMDAL Study in 2013 by the UNSRI Team, no elephants were found in the area surrounding the PT. SERD project. When elephants are found in the area around the PT SERD project, the "Chance Find Procedure" procedure will be implemented in accordance with the SOP.
		b. Is there any external agency involvement should wildlife conflict or sighting is reported? Forum Gajah is ready to help if the company needs assistance in human and wildlife conflict.	SERD has worked together with relevant agencies regarding wildlife conflict and sightings.
		c. It is advised for the company to form a Forest Protection Team to anticipate illegal hunting/poaching and land encroachment.	SERD has established and has a forest security unit (SATPAMHUT) established, appointed and approved by the Head of Forestry Office of South Sumatra Province.
		d. Data perlu dilengkapi dengan data kelelawar.	There are results on bats as there are no primary and secondary data on this.

No.	Subject	Questions/Suggestions/Opinions	Response
8.	Sabilillah (Forum Harimau Kita)	a. The territory of the Sumatran tiger encompasses up to 100 km and their daily food consumption reaches 6 kg. Thus, the Sumatran tiger is a very sensitive species.	Suggestion is accepted and will be accommodated.
		b. The local people should be educated on illegal hunting/poaching.	PT. SERD together with Forestry Agency has conducted socialization and counseling to the people living around the project area.
		c. Five motorcycles belonging to the company went missing which indicates the lack of synergy between the company and the local people.	This case is a purely criminal case, thus it has nothing to do with biodiversity studies.
9.	Hendi (GIZ BIOCLIME)	a. It is expected that all findings from the company can be submitted to the central database of South Sumatra.	The fulfillment of the obligations of PT. SERD to the government has been conducted by reporting periodically through the UKL-UPL report and subsequently will be reported in the RKL-RPL report.
		b. All biodiversity findings must be improved with ecosystem description. The critical habitat is not limited to the forest area.	Found in the project area were natural habitat (montane forest and submontane forest) as well as modified habitat (plantation).
		c. It is expected that there would be a description regarding the correlation between the discovered flora and fauna species in the document.	Discussion regarding this correlation will be added in the document.
10.	Bambang Hendro (Protection Forest Watershed Management	d. The scientific name of the Semah fish must be corrected.	Suggestion accepted.
		a. In the overall landscape of Bukit Jambul (which is connected to Bukit Barisan Selatan), there are four (4) KPH units. The consultant and company must look at the Long-Term Management Plan (<i>Rencana Pengelolaan Jangka Panjang</i> -	The survey results will be used as inputs for the action plans.

No.	Subject	Questions/Suggestions/Opinions	Response
	Board Musi)	RPJP) which can help improve the document.	
		b. Forest degradation and illegal hunting/poaching must be anticipated through education to the local people.	Suggestion is accepted and will be accommodated.
11.	Octavia (Conservation And Natural Resources Agency South Sumatra)	a. Human and wildlife conflict potential: The Conservation and Natural Resources Agency (<i>Balai Konservasi dan Sumber Daya Alam</i> - BKSDA) has already worked together to form a special unit for these cases. One of these special units are stationed within the vicinity of the project area. SERD can work together with this unit.	SERD has prepared a coordinative pathway to anticipate human and wildlife conflict issues. In doing so, SERD will work together with other agencies, such as BKSDA. This has been included in the action plans.
		b. Although it has been a long time since elephants are reported in the area, a focused study is still required because the project area is located within the elephants' roaming area. BKSDA has worked together with Universitas Sriwijaya and GIZ to prepare a study on wildlife habitat, which includes elephants, that can be used as a reference.	In some previous biodiversity studies, no elephants were found around the PT. SERD project area, when in future elephants were found in the area around the PT SERD project, the "Chance Find Procedure" will be implemented in accordance with the SOP.

Second Session

1.	Arum (Universitas Sriwijaya, Biology Dept)	a. Except habitat, species physiology and behavior should also be considered in conservation efforts.	Suggestion is accepted.
2.	Muhammad Iqbal (KPB SOS)	a. It is advised to look for potential avian corridor accesses in the project area.	Because the PT SERD project area is a large area of protected forest, thus access to bird corridors can not be specifically identified.

No.	Subject	Questions/Suggestions/Opinions	Response
		b. It is advised to observe sensitive bird species which are declining in population.	Suggestion is accepted.
		c. If possible, land clearing should not be conducted during bird migration or copulation periods.	Suggestion is accepted.
		d. Bird migration patterns are advised to be subjected to further research. This is to identify the patterns of sensitive species.	Greencap and SERD has conducted bird survey since 2012 and the method is still in development. With the development of gained knowledge, it is expected that patterns of certain species may be discovered.
		e. If possible, the study results should be published and distributed to the local people in the form of pocket books as part of the socialization effort.	PT. SERD and Forestry Agency have provided socialization and counseling to the local community and has also installed fences and warnings / signs in forest-related project areas.
3.	Jun Harbi (Kehutanan UM Palembang)	a. It is advised that the BAP document is in line with the RPJP.	Suggestion is accepted.
		b. Does the study include the identification of direct and indirect impacts in the project area? For example, a shift in local culture due to company arrival.	Direct and indirect impacts are discussed in the document.
		c. Apart from RPJP, BAP should also be synchronized with Green Growth South Sumatra and IBSAP.	Suggestion is accepted.
4.	Ira Rihatini (Energy and Mineral Resources Agency)	a. The company is advised to establish unique flora/fauna species as the company's mascot.	Suggestion will be considered.

No.	Subject	Questions/Suggestions/Opinions	Response
		b. The company is advised to improve internal coordination regarding the presentation content: 1) night time lighting should be adjusted for humans and wildlife; and 2) is there any drilling activity at night time?	1) What is meant by lighting here is lighting that is not directed to the vegetation area and focused only on the working area; and 2) Drilling is not conducted at night time.
		c. All equipment belonging to the company must be certified to operate.	All of SERD equipment has been certified for operation.
		d. The company SOP must be updated based on its needs.	The company SOP is updated based on recent findings and/or reports. For example, the Emergency Response Plan (ERP) is the most updated SOP document.
5.	Muhammad Iqbal (KPB SOS)	a. The local community feels they already received sufficient awareness training yet the technology available locally is inadequate for conservation. Community empowerment should be raised, for example: organic coffee, which sells in a higher price than ordinary coffee, can become utilized as an environmental-friendly commodity.	SERD has worked together with Universitas Sriwijaya in improving community engagement. One of the efforts that has been conducted is training for intensification methods in agriculture. No training on advanced technology has been conducted.
		b. Awareness towards biodiversity should be educated in local schools.	Suggestion will be considered.
6.	Sabilillah (Forum Harimau Kita)	a. CSR programs is more focused on the villages located at the downstream compared to villages at the upstream. There should be more focus on villages at the upstream to ensure villages at the downstream are not affected.	Suggestion will be considered.
		b. How can we educate the local people to increase their land productivity despite their limited space? This is not limited to	Suggestion will be considered.

No.	Subject	Questions/Suggestions/Opinions	Response
		agriculture but also husbandry.	
		c. Will the revegetation method process be based on agroforest principles (for community utilization) or restoration forest principles (for ecosystem restoration)?	SERD is currently still developing a revegetation method which can integrate agroforestry and restoration forest principles to cater both lender and national government requirements. This is conducted for economic reasons.
7.	Ade Kusuma (Forum Gajah)	a. Natural habitat conservation and preservation is not only the responsibility of SERD but also all stakeholders. However, SERD must remember that all described methods must be implemented and not for the sake of administration requirements from the lenders	Suggestion is accepted.
8.	Indra Yustian (Universitas Sriwijaya, Biology Dept)	a. Biodiversity offset: What kind of approach will be used by the company?	Offset is the re-creation of new habitats as an effort to replace the project-caused impacts on critical habitats. Based on requirements by lenders and the MoEF, the concept of biodiversity offset is based on "no net loss" (one tree lost is exchanged by one tree grown). This practice has different concepts in different places. For example, in lenders this may be interpreted as one tree lost in a certain ecosystem should be exchanged with another tree grown in the same ecosystem, whereas in MoEF the same tree can be exchanged in an urban green space. However, certain lenders may apply "net gain" principles in the biodiversity offset (one tree loss is exchanged with more than one tree).

No.	Subject		Questions/Suggestions/Opinions	Response
9.	Adi Kunarso (Palembang Environmental and Forestry R&D Agency)	a.	Regarding community empowerment, another commodity apart from coffee that can be utilized is rattan (which can be used for natural coloring).	Suggestion will be considered.
10.	Hendi (GIZ BIOCLIME)	a.	What would be the indicator of success for the action plan? How far has the company conducted these programs?	The indicator already exists in the complete BAP document.
		b.	Natural habitat conservation and preservation is not only the responsibility of SERD but also all stakeholders.	Suggestion accepted.
		c.	It is advised that the actions plans are categorized based on issues, not project phases.	Suggestion accepted.
		d.	If the output is a database, then the inventory must be updated.	Suggestion accepted.
11.	Bambang Hendro (Protection Forest Watershed Management Board Musi)	a.	There is a plan for the development of a hydropower dam within the project vicinity. This should be considered and anticipated to prevent negative effects to the project.	Will be a matter of consideration.
		b.	Most of the land has been converted into coffee plantation. It is advised that the future commodity to be developed is not coffee.	Suggestion will be considered.
		c.	Bee farming: If there is sufficient food resource, bee farming can be harvested all-year round. If most of the land has been converted into coffee plantation, then the harvest would be	Suggestion will be considered.

No.	Subject		Questions/Suggestions/Opinions	Response
			seasonal.	
12.	Bonsen Hendi (Environmental Agency Kota Pagar Alam)	a.	The document should be synchronized with all environmental documents present in the regional office.	The environmental documents in the area will be used as reference.
		b.	The document should be synchronized with other documents belonging to SERD.	All SERD documents have already been synced.
13.	Adi Kunarso (Palembang Environmental and Forestry R&D Agency)	a.	Water management: If the company is not careful, there may be issues regarding water quality within the local community. It is advised that the company would anticipate this by applying the relevant technology, such as sedimentation pond establishment.	This is in accordance with the commitments contained in the AMDAL.
14.	Octavia (Conservation And Natural Resources Agency South Sumatra)	a.	There has not yet been a specific study regarding the effects of noise towards wildlife in the project area. Has this become a consideration?	SERD has designed a method where project activities will not cause noise to the local community and also wildlife. Until now no studies have been found on the acceptable noise of wildlife in forest ecosystems.
15.	Sabilillah (Forum Harimau Kita)	a.	It is advised to erect fences around the power plant facilities to prevent wildlife from entering the power plant area.	PT. SERD has erected fences to avoid such conditions.
16.	Indra Yustian (Universitas Sriwijaya, Biology Dept)	a.	Was there a Sumatran striped rabbit in the study?	The Sumatran striped rabbit was not found in the primary and secondary data. For BAP requirements, it is included in the study as literature review suggested the species is present in the DMU boundary.



Pusat Kajian Sains Terapan
FMIPA Universitas Sriwijaya

Ref. No.: 247 /GC-GE/V/2017

Jakarta, 4 Mei 2017

Kepada Yth,
Daftar Undangan Terlampir
di
tempat

Perihal: Workshop dan Konsultasi Rencana Aksi Pengelolaan Keanekaragaman Hayati Wilayah Kerja Panas Bumi PT. Supreme Energi Rantau Dedap Lanskap Bukit Jambul Gunung Patah Provinsi Sumatera Selatan

Dengan hormat,

PT. Greencap NAA Indonesia merupakan konsultan yang ditunjuk oleh PT Supreme Energi Rantau Dedap (PT SERD) untuk melakukan kajian keanekaragaman hayati di sekitar lokasi Pembangkit Listrik Tenaga Panas Bumi (PLTP) Rantau Dedap. Kegiatan pengumpulan data telah dilakukan pada tahun 2017. Greencap bekerja sama dengan Pusat Kajian Sains Terapan (PKST) FMIPA UNSRI, berencana untuk melakukan **Workshop dan Konsultasi Rencana Aksi Pengelolaan Keanekaragaman Hayati Wilayah Kerja Panas Bumi PT SERD Lanskap Bukit Jambul Gunung Patah Provinsi Sumatera Selatan**. Workshop dan konsultasi dengan para pemangku kepentingan ini bertujuan untuk mendapatkan masukan terhadap hasil kajian tersebut. Bersama ini kami mengundang Bapak/Ibu sebagai perwakilan dari instansi terkait untuk dapat hadir pada:

Hari/Tanggal	Senin, 15 Mei 2017
Waktu	08.30 s/d 16.00 WIB (susunan acara terlampir)
Tempat	Hotel Grand Zuri Palembang Jl. Rajawali No.8, 9 Ilir, Ilir Tim. II, Kota Palembang, Sumatera Selatan 30113, Indonesia

Konfirmasi kehadiran dapat dilakukan kepada Sdr. Willy Aulia (willy@envirosc.com atau 0813-1711-0028). Kehadiran Bapak/Ibu sangat kami harapkan dan atas perhatian serta dukungannya, kami mengucapkan terima kasih.

Hormat kami,
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Kerja Panas Bumi PT. Supreme Energi Rantau Dedap Lanskap Bukit Jambul Gunung Patah
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Latar

Indonesia merupakan salah satu negara dengan luas kawasan hutan tropis terbesar ketiga di dunia, memiliki keanekaragaman hayati yang tinggi dan dikenal sebagai negara "mega-biodiversity". Akan tetapi Indonesia merupakan negara terbesar ketiga di dunia yang paling cepat dalam kehilangan kawasan hutannya. Pemerintah Indonesia berupaya dan bertekat untuk mengurangi emisi gas rumah kaca dari sektor kehutanan, melestarikan ekosistem hutan bernilai keanekaragaman hayati tinggi, menjaga kapasitas penyimpanan stok karbon, menerapkan pengelolaan hutan berkelanjutan untuk kepentingan rakyat serta mengembangkan dan menerapkan konsep konservasi dan pengelolaan keanekaragaman hayati.

Salah satu langkah proaktif dalam mewujudkan pengelolaan keanekaragaman hayati yang berkelanjutan di daerah adalah dengan mengembangkan dan menerapkan strategi dan rencana aksi pengelolaan, konservasi dan perlindungan keanekaragaman hayati di tingkat lokal. Sumatera Selatan perlu mengatur strategi dan rencana aksi yang menyeluruh, efektif dan partisipatif untuk mengurangi dampak hilangnya keanekaragaman hayati dari deforestasi, fragmentasi dan skema pembangunan lain di wilayah ini. Tujuan dari pengembangan Rencana Aksi Pengelolaan Keanekaragaman Hayati di tingkat lokal adalah untuk mengambil tindakan yang efektif dan mendesak dalam upaya menghentikan hilangnya keanekaragaman hayati dalam rangka untuk memastikan bahwa pada tahun 2020 ekosistem terlindungi dan terus memberikan layanan jasa lingkungan penting, sehingga mengamankan berbagai bentuk kehidupan dan memberikan kontribusi untuk kesejahteraan dan pengentasan kemiskinan.

Sebagai salah satu bagian dari tujuan besar tersebut, PT. Supreme Energi Rantau Dedap (PT SERD) berupaya untuk menyusun rencana aksi pengelolaan keanekaragaman hayati khususnya di wilayah kerjanya yang mencakup lanskap Bukit Jambul Gunung Patah di Provinsi Sumatera Selatan. PT SERD berharap dapat berkontribusi dalam pengelolaan keanekaragaman hayati yang ada di salah satu tipe lanskap perbukitan yang ada di wilayah Provinsi Sumatera Selatan.

Sebagai langkah awal, PT SERD bekerja sama dengan Greencap dan Pusat Kajian Sains Terapan (PKST) FMIPA UNSRI akan menyelenggarakan kegiatan Workshop dan Konsultasi Publik untuk mengidentifikasi potensi data keanekaragaman hayati serta monitoring keanekaragaman hayati yang tepat untuk pengelolaan keanekaragaman hayati tersebut di lanskap Bukit Hambul Gunung Patah Provinsi Sumatera Selatan. Pada akhirnya, rencana pengelolaan keanekaragaman hayati ini diharapkan mampu mendukung dalam pengelolaan keanekaragaman hayati Sumatera Selatan.



Tujuan:	<p><i>Workshop dan Konsultasi Publik</i> bertujuan:</p> <ol style="list-style-type: none">1. Mendapatkan masukan dan saran dari para pihak tentang pengelolaan keanekaragaman hayati di wilayah kerja PT SERD di lanskap Bukit Jambul Gunung Patah Provinsi Sumatera Selatan .2. Membangun dukungan dan komitmen para pihak terkait pengelolaan keanekaragaman hayati di Sumatera Selatan.
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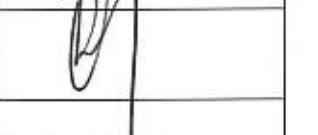
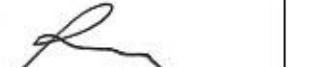
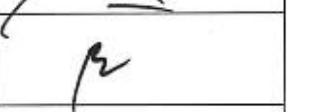
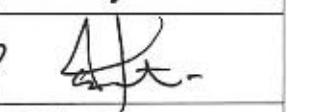
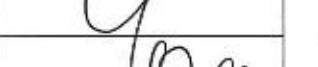
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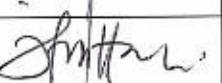
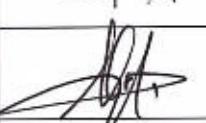
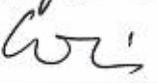
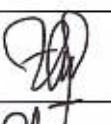
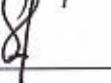
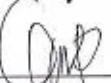
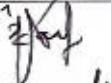
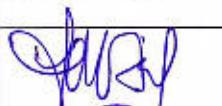
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08.30-09.00	Registrasi Peserta	Panitia
09.00-09.15	Pembukaan: <ul style="list-style-type: none">• Pengantar dari Perusahaan (PT. SERD)• Pengantar dari Dinas Kehutanan Provinsi Sumsel• Pembukaan acara secara resmi oleh Dekan FMIPA Universitas Sriwijaya	MC
09.15-09.45	Panel Presentasi (Narasumber) <ul style="list-style-type: none">• Rona lingkungan berkaitan dengan lokasi landscap Bukit Jambul Gunung Patah (Hasil monitoring Greencap)	Moderator
09.45-10.00	Rehat kopi	
10.00-11.00	Lanjutan Panel Presentasi (Narasumber) <ul style="list-style-type: none">• <i>Critical Habitat Assesment (CHA)</i> dan Prakiraan Dampak Proyek terhadap Biodiversity: SERD/Greencap	
11.00-12.00	Panel diskusi dengan narasumber	Moderator
12.00-13.00	ISHOMA	Seluruh Peserta
13.00-15.00	Presentasi <ul style="list-style-type: none">• <i>Biodiversity Action Plan</i> dan Diskusi	Fasilitator
15.00-15.30	Rehat kopi	
15.30-15.55	Kesimpulan dan rekomendasi	Moderator
15.55-16.00	Penutup	



DAFTAR HADIR

Acara : Workshop dan Konsultasi Rencana Aksi Pengelolaan Keanekaragaman Hayati Wilayah Kerja
 Panas Bumi PT. Supreme Energi Rantau Dedap Lanskap Bukit Jambul Gunung Patah Provinsi
 Sumatera Selatan
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 Waktu : 08.30 s/d 16.00 WIB
 Tempat : Hotel Grand Zuri Palembang

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Supreme Energy Rantau Dedap Public Consultation

PT Supreme Energy Rantau Dedap (PT SERD) has just conducted the Public Consultation for Rantau Dedap Geothermal Power Plant Development on **Monday, 17 July 2017** in SERD Talang Pisang Conference Hall at RanTunggul Bute for Rantau Dedap – Segamit Village (Semende Darat Ulu Sub-District) people and on **Tuesday, 18 July 2017** in Kota Agung Sub-District Community Hall at Kota Agung, Lahat for Kota Agung Sub-District people. During this **public meeting** almost **200 person** from the surrounding villages around Rantau Dedap Project including the authorities from Head of Sub-District, Police Sub-Sector, Military Sector, Head of Villages, Community Leader and Affected People Representative including the Woman and Youth Organization Representatives were attend. There were also 1 (one) representatives from NGO: Achmed Sumengkar from World Wildlife Fund (WWF) based in Jakarta and 2 (two) representatives from Asian Development Bank : RV and Arlene Porras. And also not to mention there were some journalist from Local Mass Media was attend this meeting.

Focus Item that SERD Team disclosed was :

- Project Description including its contribution to local communities and environment.
- Land Acquisition Plan for PLN Tower Footprint
- Recruitment for Drilling and Construction Project
- Opportunities for Local Supplier
- Grievance Mechanism Procedure
- ESIA Result

During the discussion some concern raise from the villagers, youth representatives and village heads as describe below :

- The participants requires that the recruitment process of the local manpower shall be fair and transparent.
- Villagers request to SERD to support the training to local communities to meet the SERD employment requirement.
- During mobilization of the material and equipment, PT SERD shall coordinate with local communities.
- SERD CSR Program shall be more wider to reach all the village near PT. SERD.
- SERD explains that the ESIA study result including Biodiversity Action Plan, Critical Habitat Assessment, Stakeholder Engagement Plan and Grievance Redress Mechanism to make the community more aware that SERD has the procedure to keep the project safe to community and no harm to environment.
- The next meeting will be more focus on women and youth including customary representatives that will be conducted in terms of Focus Group Discussion.

This consultation is in line with the Stakeholder Engagement Plan chapter 9 regarding Stakeholder Engagement Program that has an objective to gaining support for the Project from key stakeholders and other project affected stakeholders and the consultation should be conducted regularly during pre-construction phase.

Documentation on photographs :





Documentations on online media :

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LUKAH CUNUNG GAJAH MELAYAT WARGA YANG MENINGGAL DUNIA
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<http://lahatonline.com/116267-pt-supreme-energy-rantau-dedap-gelar-konsultasi-publik.html>

===== end of report =====

Dispersion Modelling of Cooling Tower Plumes at Rantau Dedap Geothermal Power Plant

Air Dispersion Modelling Report

PT Supreme Energy Rantau Dedap

Project Number: JKTD15040

December 7 2017

Quality information

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Revision History

Revision	Revision date	Details	Authorized	Name	Position
4	12/7/2017	Revision for higher capacity of 90.9MW net -Final issue		Andrew Sembel	Manager, Environment
3	9/27/2016	Revised final – new accommodation block location	-signed-	Andrew Sembel	Manager, Environment
2	9/8/2016	Final Issue	-signed-	Andrew Sembel	Manager, Environment
1	9/2/2016	Revised for Client comments	-signed-	Andrew Sembel	Manager, Environment
0	8/26/2016	Draft Issue for Client Review	-signed-	Andrew Sembel	Manager, Environment

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Appendix D Power Plant Layout

1. Introduction

1.1 Background

PT. Supreme Energy Rantau Dedap (SERD) is the operation company established by the Joint Venture of Supreme Energy, Engie and Marubeni with the concession for Rantau Dedap awarded in early December 2010. SERD has received the price approval and assignment from the Indonesia Minister of Energy and Mineral Resources through assignment letter No. 5834/26/MEM.L/2011 September 30, 2011, to develop the geothermal field and power plant in Rantau Dedap. The Rantau Dedap geothermal prospect is located in the Muara Enim, Lahat and Pagar Alam Regencies of South Sumatra, approximately 225 km from Palembang.

PT AECOM Indonesia (AECOM) has been commissioned by SERD to prepare Air Dispersion Modelling (ADM) to demonstrate compliance with applicable standards. This report therefore provides an assessment of the air quality impact associated with the power plant operation.

The primary air emissions of concern which have potential to cause odor nuisance and health effects from the power plant will be the non-condensable gases (NCG). NCG are gases that are present with range of 0.09-2.0 wt% in the geothermal fluid but are removed during the electricity generation process. The NCG consist predominantly of carbon dioxide (approximately 97%), but also contains hydrogen sulphide (H_2S). The NCG will be released from vents located above the mechanical evaporative cooling towers.

The previous air dispersion modelling report issued by AECOM in August 2016 was based on a 86.9MW plant design. This revision considers the increase to a higher capacity of 90.9MW net or 98.4MW gross. The dispersion model uses actual well field assumptions and a conceptual proposal design from the EPC contractor REKIND-FUJI.

1.2 Purpose of This Report

The purpose of this report is to conduct an ADM using air dispersion modelling to predict potential H_2S impacts at nearby sensitive receptors from emissions associated with the geothermal power plant operation. This report has been undertaken in accordance with the British Columbia Air Quality Dispersion Modelling guidance (BC Ministry of Environment, 2015).

1.3 Project Scope

The ADM for the proposed SERD power plant was based on the air dispersion model Calpuff and assessed the contribution to air quality impacts at nearby sensitive receptors from the power plant. In summary, the report provides information on the following:

- A description of the proposed power plant development;
- Identification of relevant air quality criteria;
- Identifies nearby sensitive receivers which may be impacted by emissions from proposed development;
- A description of the modelling methodology including input parameters including meteorology, terrain and air emissions;
- An assessment the air quality impact of power plant operations against the relevant ambient air quality criteria; and
- A discussion of the potential impacts and recommendations.

2. Project Outline

The Rantau Dedap geothermal prospect is located in the Muara Enim, Lahat and Pagar Alam Regencies of South Sumatra, approximately 225 km from Palembang. The contract area covers approximately 35,440 ha (18.56 km x 19.63 km) and is situated at an elevation ranging from 1,000 to 2,600 metres (m) on the Bukit Besar volcanic complex, in which the existence of the geothermal system is indicated by a wide distribution of thermal manifestations, particularly on the flank of it.

The Rantau Dedap Geothermal Project implementation is being undertaken in two phases. Phase 1 constitutes the geothermal resource exploration and drilling phase. Steam-field development and power plant construction will be part of Phase 2. SERD is currently undertaking exploratory drilling to investigate the geothermal resource

and now intend to undertake the development of the geothermal power project through to commercial operation of a geothermal power plant comprising two units of approximately 49.2 MW each.

The power plant will use dual pressure condensing steam turbine technology. The steam turbine plant includes 2 x 49.2 MWe (nominal-gross) condensing steam turbine generators, each with a dual steam inlet. The geothermal fluid is first flashed and separated into high pressure steam and geothermal water components at a specific pressure. The geothermal water is also flashed to produce an additional low pressure steam flow. The separated steam flows then pass through the steam turbines to drive electricity generators.

After passing through the turbines, the steam is condensed using direct-contact condensers. In direct-contact condensers the cooling water from the cooling tower is sprayed directly into the condenser, mixing with and condensing the incoming exhaust steam. The heated water from the condensers is then cooled in a cooling tower.

Non-condensable gases, which occur naturally in the geothermal steam, are extracted from the steam side of the condenser and piped to the cooling tower for discharge in the cooling tower plume. In direct-contact condensers, a portion of the non-condensable gases is dissolved into the cooling water, while the remainder is extracted and piped to the cooling tower.

The cooling towers for the plant will be induced mechanical-draft, counter flow types. Each cooling tower will consist of seven (7) fan cells arranged in a straight line. The dimension of each tower is 111 m long and 17 m wide, with height of 17 m above base level (REKIND-FUJI, 2017).

3. Assessment Criteria

Emission concentrations of the H₂S from the power plant will be compared against the applicable Indonesia emission standard, and the incremental concentrations of H₂S in the ambient air predicted by Calpuff will be added to the baseline concentrations and compared with ambient air quality standards. The ambient standards are intended to minimise the adverse effects of airborne pollutants on sensitive receivers. The criteria for this assessment are set out in the following sections.

3.1 Emission Standards

The State Minister of Environment of the Republic of Indonesia has set Regulation No 21 of 2008 (MENLH, 2008) that stipulates emission standards for stationary sources in thermal power plants including geothermal power plants. In this Regulation, the H₂S emission standard was set to 35 mg/m³ at normal conditions (temperature of 25°C and pressure of one atmosphere).

The IFC EHS Guideline for Geothermal Power Generation (IFC, 2007) which has been used, as a reference for international guideline, did not establish an emission standard for H₂S. This was because IFC did not consider the H₂S emission from a geothermal power plant to be significant. However in the Guideline IFC recommended that H₂S emissions "should not result in ambient concentrations above nationally established air quality standards or, in their absence, internationally recognized guidelines".

For this study, the H₂S emission has been compared against the Indonesia Emission Standard as mentioned above.

3.2 Ambient Standards

In Indonesia, H₂S concentrations in the ambient air was regulated in the Minister of Environmental Decree No 50 of 1996 regarding Odor Standard (MENLH, 1996). Thus H₂S was considered as an odor. The ambient standard for this gas stipulated in this regulation is 0.02 ppm which is equivalent to 28 µg/m³. The regulation did not mention what the averaging period for the the standard should be. However, since it is for an ambient standard, it is believed it is for a 24 hour average.

The ambient standard is applicable for residential and general areas only. For industrial areas, another standard is applicable. In 2011, the Minister of Employment and Transmigration of The Republic of Indonesia set forth Regulation Number PER.13/MEN/X/2011 regarding Threshold Values for Physical and Chemical Factors in the Working Environment (MENAKERTRANS, 2011). In this regulation, the H₂S threshold value is 1 ppm which is equivalent to 1,400 µg/m³. This value is for an eight hour averaging time which is normal working day for a worker.

WHO's Air Quality Guidelines for Europe (WHO, 2000) contains an ambient air H₂S guideline of 150 µg/m³ as a 24-hour average to ensure no health effects occur. Furthermore in order to avoid any substantial odor complaints among the exposed population WHO adds a guideline value of 7 µg/m³ as 30 minute average.

However, as quoted in the Kawerau Geothermal power plant Air Discharge Assessment (Fisher & Heydenrych, 2005), the guideline of 7 µg/m³ for one hour average is not appropriate for geothermal areas for odor effect. In this report, Fisher & Heydenrych quoted several studies that all assumed 70 µg/m³ was more appropriate guideline for geothermal power stations in regions affected by natural geothermal emissions. Furthermore they explained for populations that have been adapted to the smell of hydrogen sulphide, 70 µg/m³ is unlikely to produce complaint. On the contrary, for populations that do not experience high natural levels of emissions, levels of above 7 µg/m³ are likely to be noticed.

The 70 µg/m³ for one hour average more or less will give the result of 28 µg/m³ for 24 hour average. Therefore it is equivalent to the Indonesia Odor Standard as explained above. For study in this report, the 28 µg/m³ for 24 hour average is used as assessment criteria for H₂S ambient concentration.

4. Emission Inventory

SERD is proposing that its H₂S emission will meet the emission quality standard from the Government of Indonesia as discussed in Section 3.1. For the purpose of estimating the emissions, it is assumed that the plant operates in a steady-state condition. The H₂S will be emitted together with other NCG from vents located above the mechanical evaporative cooling towers.

The SERD geothermal power plant will have two identical cooling tower units. Each unit will consist of seven fans. For the purpose of the dispersion modelling with Calpuff, emission rates need to be calculated in units of grams per second (g/s) at the point of emission. Based on the NCG content in the steam and H₂S content in the NCG supplied by SERD (Appendix B), the H₂S emission was calculated as 9.88 g/s per fan. With this emission rate, the emission concentration at normal condition was estimated to be 17 mg/m³, well below the Indonesian Emission Standard of 35 mg/m³.

For the purpose of modelling, a high gas case is used for the calculation. In this case, the NCG content of the gas is 1.6% in HP steam and 1.15% in LP steam with the H₂S concentration content 5% for both steams. Detailed calculations of H₂S emission are provided in Appendix B. A summary of the calculated emissions and other selected parameters are presented in Table 4-1.

Table 4-1 Calculated H₂S Emission Rate and Other Selected Parameters

Item	Value	Unit
NCG content in HP steam	1.6	% weight
NCG content in LP steam	1.15	% weight
H ₂ S content in HP and LP Steam	5	% weight
Temperature of exit airflow	301	K
Pressure of exit airflow	0.8	bar
Specific volume of exit airflow	1.11	m ³ /kg
Mass flowrate of exit air	653.81	kg/s
Volume of exit airflow at normal condition (25°C)	794.05	m ³ /s
H ₂ S concentration at normal condition	17	mg/m ³
H ₂ S mass flowrate	9.88	g/s

Note: All calculations represent one cooling tower cell (i.e. one fan)

5. Methodology

5.1 Dispersion Model

This assessment made use of the CALMET meteorological processor and the CALPUFF dispersion model (BC Ministry of Environment, 2015). A summary of the data and parameters used for both the meteorological and air dispersion modelling is presented Table 5-1.

CALMET is a meteorological model that develops hourly wind and temperature fields on a three-dimensional gridded modelling domain. Associated two-dimensional fields such as mixing height, surface characteristics and dispersion properties are also included in the file produced by CALMET. CALMET produces a meteorological file that is used within the CALPUFF model to predict the movement of air pollution.

CALPUFF is a non-steady state, three-dimensional Gaussian puff model developed for the US Environmental Protection Agency (USEPA) for use in situations where basic Gaussian plume models are not effective. These situations include areas where stagnation conditions occur, which are characterized by calm or very low wind speeds with variable wind direction. The CALPUFF modelling system has the ability to model spatially varying winds and turbulence fields that are important in complex terrain, long range transport and near calm conditions. As such, CALPUFF was selected as the appropriate dispersion model for this assessment.

Table 5-1 Summary of CALMET and CALPUFF Input Parameters

Parameter	Input
CALMET (v6.334)	
Meteorological grid domain	12 km x 12 km
Meteorological grid resolution	500 m resolution (24 x 24 grid cells)
Reference grid coordinate of southwest corner	314.852 E, 9529.081 S (Zone: 48)
Cell face heights in vertical grid	0, 20, 40, 80, 160, 300, 600, 1000, 1500, 2200 and 3000 m
Simulation length	3 years (2013-2015)
Surface meteorological stations	CALMET No-Obs Mode: CALMET used Numerical Weather Prediction model outputs.
Upper air meteorological station	No upper air stations. The 3-dimensional gridded prognostic data were used as the initial guess wind-field for CALMET.
Terrain data	Terrain elevations were extracted from the NASA ASTER dataset (ASTER 30 metre, 1-arc sec). Elevations at power plant site were modified using final elevations data.
Land use data	Generic land use based on data from Indonesia Department of Forestry.
CALPUFF (v6.42)	
Modelling domain	Computation grid: 12 km x 12 km
Modelling grid resolution for mapping purpose	Grid resolution: 500 m
Number of discrete receptors	A total of 90 discrete receptors were added surrounding the plant.
Dispersion algorithm	Turbulence-based coefficients
Hours modelled	26,280 hours
Meteorological modelling period	1 January 2013 – 31 December 2015

5.2 Model Input Determination

5.2.1 Source Parameters

For cooling towers, the individual cells were modelled as point sources, mimicking individual stack emission points. The total emissions from the cooling tower were divided equally between each individual cells. The stack parameters used for modelling inputs were based on the characteristics of the cooling tower fan, which is assumed to behave like a "stack".

The vertical velocity was determined by the fan rate (fan blows air at a certain flow rate). The exit diameter was determined by the cross-sectional area of the cooling tower. The stack height would be the actual height of the cooling tower. Summary of the source parameters for individual cells of SERD Cooling Tower is provided in Table 5-2.

Table 5-2 Source Parameters for Individual Cells of Cooling Tower

Specification	Unit	Value
Stack height	m	17
Stack outlet diameter	m	8.5
Stack volumetric flowrate (at actual condition)	m ³ /s	723
Stack exit velocity	m/s	12.8
Flue gas temperature	°C	28

Source: Calculated based on information provided in the bid proposal (REKIND-FUJI, 2017)

As stated in the Original ESIA, upset conditions at the SERD Geothermal Power Plant have not been assessed separately as this operating scenario is considered to represent a lower quality impact than normal operation.

5.2.2 Building Downwash Investigation

The term building downwash is defined as the effect caused by the aerodynamic turbulence induced by a nearby building that may result in high ground-level concentrations in the vicinity of a stack (USEPA, 1992). Thus, the possibility of downwash influences should be investigated.

The effect of building downwash on pollutant dispersion from cooling tower was incorporated in the dispersion model using the ISC building wake algorithm. Building Profile Input Program (BPIP) was used to prepare downwash related input for the ISC algorithm. BPIP can determine whether a point source is subjected to wake effects from a structure(s), and calculate building heights and projected building widths for cases when the plume is affected by building wakes. Table 5-3 summarizes parameters for buildings investigated for downwash effect based on power plant layout (Appendix D).

Table 5-3 Parameters for Buildings Investigated for Downwash Effect

Notation	Cooling Tower ^a	Turbine Hall
Building length (m)	111 ^b	83 ^b
Building width (m)	17 ^b	34 ^b
Building height above base elevation (m)	17	30 ^c
Building base elevation (m)	1,960	1,960 ^c

Notes:

- a. Parameters for cooling tower are for one of two identical tower units.
- b. Building length and width are calculated based on building corner coordinates input into the BPIPPRIME model.
- c. The turbine building height is input into the model 2 m lower than its actual height (30 m) considering that the actual turbine building base elevation is 2 m lower than the cooling tower base elevation. Structures modelled at single elevation to avoid complex terrain model set up.

From the building investigations above, it can be concluded that all buildings are within stack influence areas and they will induce building downwash. As the result, building downwash algorithm is included in Calpuff input files for this study.

5.2.3 Meteorological Conditions

Meteorological conditions determine the direction of movement and dispersion of emissions carried by the wind. Key meteorological parameters include air temperature, wind direction, wind speed, and mixing height. Ideally, this data can be obtained from the nearest meteorological station of the study area. For modelling purposes, the data that is needed is for each one hour interval within a period of three years for each of the key parameters. In Indonesia, this kind of hourly data is not available in all existing meteorological stations.

SERD had installed a weather station at warehouse on 2012. The station has made hourly meteorological observation since February 2012 until now. Parameters observed are wind speed, wind direction, temperature, relative humidity, barometric pressure, rainfall, and evaporation. The weather station is located in 5 km distance from the planned power location. Further data evaluation from this station showed that there is high percentage of missing hours. Therefore the weather station data cannot be used for the modelling purposes and data from a meteorological institute is to be obtained.

The forecast meteorological data was then obtained from Lakes Environmental. Lakes Environmental is a company based in Ontario, Canada which provides meteorological modelling for dispersion modelling purpose for any location in the world. For this purpose, Lakes Environmental utilizes WRF (Weather Research Forecasting) model from NCAR (National Center for Atmospheric Research), which is a research and development institute in field of atmosphere in the United States. For this study, meteorological data from Lakes Environmental was obtained for period from January 1, 2013 to December 31, 2015 (three years) with one hour data interval. These data sets were pre-processed with Calmet, the meteorological data pre-processor for Calpuff.

Based on data from the Lakes Environmental, the wind directions at the project site are very scattered. This shows that the wind in the area surrounding the project site is highly affected by terrain. West Southwest direction only dominates with frequency of 13.5%. Yet, the frequency of the wind from the opposite direction is less than 2% different i.e. 11.9%. Third dominant wind comes from the South Southeast with frequency of 11.5%. Number of calm winds is only 1.5%. The average wind speed is 1.68 m/s. The resultant wind rose is presented in Figure 5-1.

A comparison of the CALMET processed meteorological data with climate data collected from the SERD meteorological station is located in Appendix A.

CALMET.DAT: Interpolated to [(I,J)=(22.880, 14.854)] [(X,Y)km=(326.042, 9536.258) in MODEL Projection]
Height = 10.00 m; [Jan 1, 2013 - 1:00:00 AM to Jan 1, 2016 - 12:00:00 AM (UTC+0700)]
Annual(Jan to Dec): Total Periods = 26280; Valid Periods = 26280 (100%); Calm Wind Periods = 407

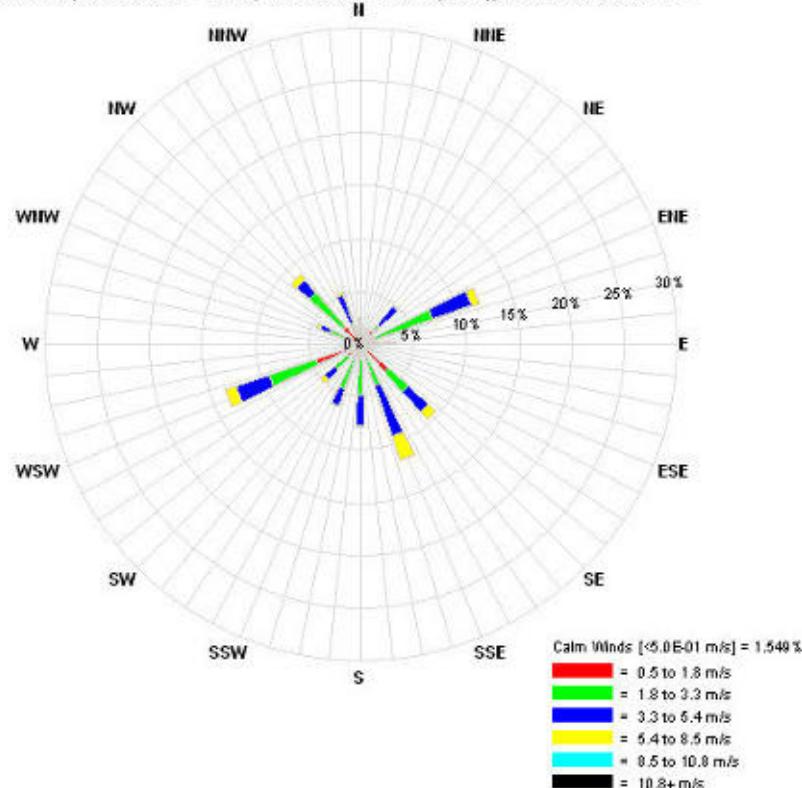


Figure 5-1 Wind Rose Based on Forecast Data from Lakes Environmental (Period of January 1, 2013 - 31 December 2015)

5.2.4 Modelling Domain and Representative Receptor Network

For this study, dispersion is modelled over a 12 km x 12 km domain with the power plant cooling tower in the centre. This domain is considered to have covered all settlements closest to the study area.

For the purpose of input into Calpuff, receptor points are modelled in the form of representative receptor networks. The distribution of concentrations will be calculated based on this receptor network. In this model, the representative receptor is modelled as an arbitrary polar network with power plant cooling tower as its centre point. In this network, the receptor points are placed at 500 m x 500 m grid. This will generate 576 representative receptor points.

5.2.5 Sensitive Receptors

The impact of air emissions on sensitive members of the population is of particular concern. Sensitive receptors include areas such as residences, schools, mosques, churches, marketplaces, clinics, etc. They are selected by identifying rooftops from Google Earth Satellite Imagery and field survey undertaken by SERD. Using this approach, 81 sensitive receptors were selected. For assessing health impact of H₂S to the workers, nine locations representing workers inside the plant were added to the sensitive receptors. These were intended to represent where an individual worker might be at some point in a working day. A complete list of sensitive receptors is provided in Appendix C.

5.2.6 Topography

Topography affects the distribution of pollutant concentrations at certain points. Therefore topographic data needs to be entered into the Calpuff model. For this study topographical data were captured from ASTER GDEM. For Indonesia, terrain data are available at approximately 30 m resolution (1-arc seconds).

However since the elevation of the power plant site will be changed because of cut and fills works, final elevation of the site from the design data were incorporated into the Aster GDEM data. The combined data were then

processed with ArcGIS software to obtain new elevation data in XYZ. Topography map of the modelling domain is provided as Figure 6-1.

The immediate elevations surrounding the power plant vary between 1,905 m to 1,965 m. In the wider context of the study area, the elevations are lower to the north and higher to the south with the highest points at the southwest area.

5.2.7 Land Use

The latest land use data for the modelling domain were taken from the Department of Forestry. In order to use this data for the model, it was first converted into a generic xyz file. The procedure for creating this xyz file available in the BC Air Quality Modelling Guideline is followed. For simplicity, the land use types from the Indonesian Department of Forestry were changed into equivalent BC types. The result file was then processed using CTGPROG which is the land use processor of Calpuff.

From the processed data, the land use within the modelling domain only consists of protected forest, agriculture of coffee plantation and bush areas. The protected forest is classified as forest area by the CTGPROG as for the coffee plantation is classified by agriculture area. The forest area dominates the modelling domain with more than 50% of coverage. Bushes are spread from west to north as for agricultures are scattered at northwest, northeast and east areas.

6. Baseline Condition

Existing H₂S concentrations (baseline) are vital to the assessment of the potential impact from the proposed power plant. Baseline data are added to the predicted incremental concentrations to assess the cumulative impacts likely from the site.

The baseline measurement was carried out on 21 – 22 July 2016. The measurement was carried out only for one hour period at eight sampling points (AQ1 – AQ8). Results of the measurement are presented in Table 6-1.

Table 6-1 Baseline 1-Hour Average H₂S Concentrations

Sampling Location	Concentration ($\mu\text{g}/\text{m}^3$)	Notes on Location
AQ1	< 2.24	Kampung Yayasan
AQ2	< 2.24	Between Wellpad X, L, M and N
AQ3	8.40	Area of Wellpad I
AQ4	7.00	Area of Wellpad C
AQ5	< 2.24	Area of Wellpad E
AQ6	< 2.24	A hut Belongs to Mr. Rawadi
AQ7	5.60	Area of Wellpad B
AQ8	< 2.24	Tungul Bute Village

Note: 2.24 $\mu\text{g}/\text{m}^3$ is limit of detection

Source: Baseline study, SERD, 2016

AQ1, AQ6 and AQ8 are at residential areas and the others are at wellpad areas. It can be seen that H₂S concentrations were not detected at the residential areas. Higher H₂S concentrations were detected at wellpad areas with 8.4 $\mu\text{g}/\text{m}^3$ as the highest at wellpad I. It can also be seen that the baseline one hour average concentrations of H₂S in the project area are well below the one hour odor standard of 70 $\mu\text{g}/\text{m}^3$.

With very low one-hour baseline H₂S, the 24 hour baseline concentrations are believed to be negligible. Therefore in this study baseline 24 hour concentrations are not added to the incremental concentrations predicted by the Calpuff.

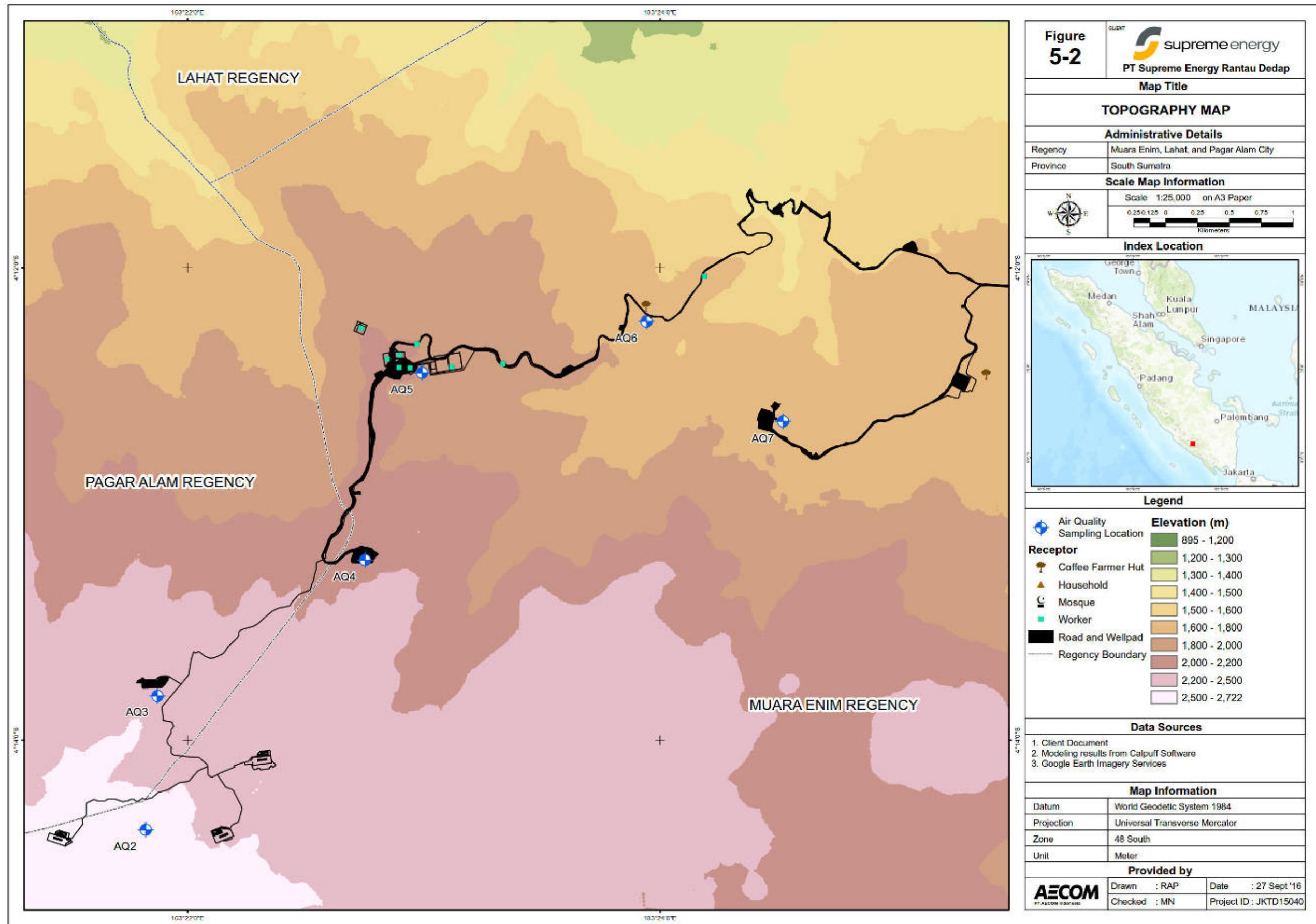


Figure 6-1 Topography Map of Study Area

7. Modelling Results

This section presents the dispersion modelling results for the proposed power plant based on the predicted emission rates as described in Table 4-1 to assess the typical or expected emissions from the proposed power plant. The model predicted concentrations are rounded to one significant value. As such, concentrations of 28.0 to 28.4 $\mu\text{g}/\text{m}^3$ would not exceed the standard 28 $\mu\text{g}/\text{m}^3$ as those concentrations would round to 28 $\mu\text{g}/\text{m}^3$.

In order to address the possibility of model over predictions, in this report the dispersion of hydrogen sulphide within the modelling domain has been presented using the predicted 99.9 percentile 24-hour and 8-hour average concentrations. Since for this study the dispersion was modelled using three year period of meteorological data, the 99.9 percentile 24-hour concentration corresponds to the 1st rank 24-hour concentrations to occur at any receptor reported by CALPUFF as for the 99.9 percentile of 8-hour concentration corresponds to the 3rd rank 8-hour concentrations.

7.1 99.9 Percentile 24-Hour Average Incremental Hydrogen Sulphide

The 99.9 percentile 24-hour average predictions discussed in this section have been undertaken to assess the potential odor nuisance effects, as opposed to the odor standard.

Figure 7-1 shows the predicted 99.9 percentile 24-hour average hydrogen sulphide concentration within the 12km x 12km domain for the expected total H₂S emission rate of 138 g/s. Figure 7-2 shows the predicted concentrations within a smaller domain (3km x 3km). These figures were made based on spatial interpolation of predicted concentrations at gridded receptors. The interpretation of these figures is as follows:

- The purple contour line corresponds to the guideline of 28 $\mu\text{g}/\text{m}^3$ used to assess potential odor nuisance impact, as discussed in Section 3.2. The 28 $\mu\text{g}/\text{m}^3$ concentration contour remains to the east and south of the plant.
- The purple triangles show the locations of existing households based on satellite/field survey identification.
- The brown tree symbols represent coffee farmer huts at coffee plantation.
- The green square symbols represent worker receptors inside the proposed power plant's perimeter fence.
- The highest concentration contour (red line) shows the areas within which predicted incremental concentrations exceed 300 $\mu\text{g}/\text{m}^3$. The next two contours show the extent of the areas within which predicted concentrations exceed 250 $\mu\text{g}/\text{m}^3$ and 200 $\mu\text{g}/\text{m}^3$. Predicted incremental concentrations exceeding 400 $\mu\text{g}/\text{m}^3$ are confined within the power plant's perimeter and will be considered in the OSHA of the O&M plan.

Based on Calpuff calculations at discrete receptors (in this case the identified sensitive receptors), the predicted concentrations are well less than the WHO guideline of 150 $\mu\text{g}/\text{m}^3$ and will not result in any adverse health effects. There is no exceedance of the 99.9 percentile 24-hour incremental concentrations. The maximum 99.9 percentile 24-hour concentration is predicted 25 $\mu\text{g}/\text{m}^3$ at R55. The maximum incremental concentrations predicted at the other sensitive receptors are in the range 6-21 $\mu\text{g}/\text{m}^3$, or less than the odor standard.

7.2 99.9 Percentile 8-Hour Average Incremental H₂S

The 99.9 percentile 8-hour predictions discussed in this section have been undertaken to assess the potential health related effects as opposed to the safety standard, in addition to the potential odor nuisance effects.

Table 7-1 shows the predicted maximum 99.9 percentile 8-hour average H₂S concentrations at nine representative worker receptors resulting from emissions from the proposed power plant and will be considered in the OSHA of the O&M plan.

**Table 7-1 99.9 Percentile 8-Hour Average H₂S Concentrations (µg/m³) at Representative Worker Receptors
(Sorted by The Highest)**

Receptor Number	Maximum Concentration *
86	1,878
85	636
88	624
75	505
87	470
83	443
84	382
56	212
90	44

* Concentrations are rounded to one significant value

Figure 7-3 shows the predicted 99.9 percentile 8-hour average H₂S concentration contributions for the proposed power plant. There is exceedance of the 99.9 percentile 8-hour incremental concentrations at receptor 86 which is located only 40 meters from the cooling tower. The highest predicted 8-Hour concentration at this receptor is 1,878 µg/m³, or 134% of the 1,400 µg/m³ threshold value in the working environment as stipulated in the Regulation of the Minister of Employment and Transmigration Number PER.13/MEN/X/2011. The incremental concentrations predicted at the other worker receptors are in the range 44-636 µg/m³, or less than the threshold value.

Table 7-2 shows frequency distribution of predicted 8-hour average H₂S concentrations at R86 within three years period of modelling.

Table 7-2 Frequency Distribution of 8-hour Average H₂S Concentrations at R86

Concentration Range* (µg/m ³)	Frequency (8-hour periods)	Percentage
0-300	2,886	87.9%
301-600	213	6.5%
601-900	136	4.1%
901-1400	32	1.0%
>1400	17	0.5%

* Concentrations are rounded to one significant value

The exceedance at R86 is only 0.5% of the time. Most of the time (88%) the H₂S concentrations at this receptor is ranging from zero to 300 µg/m³. It is also unlikely that a worker would be present at this location for an entire work day. Thus the exceedance frequency can be considered insignificant.

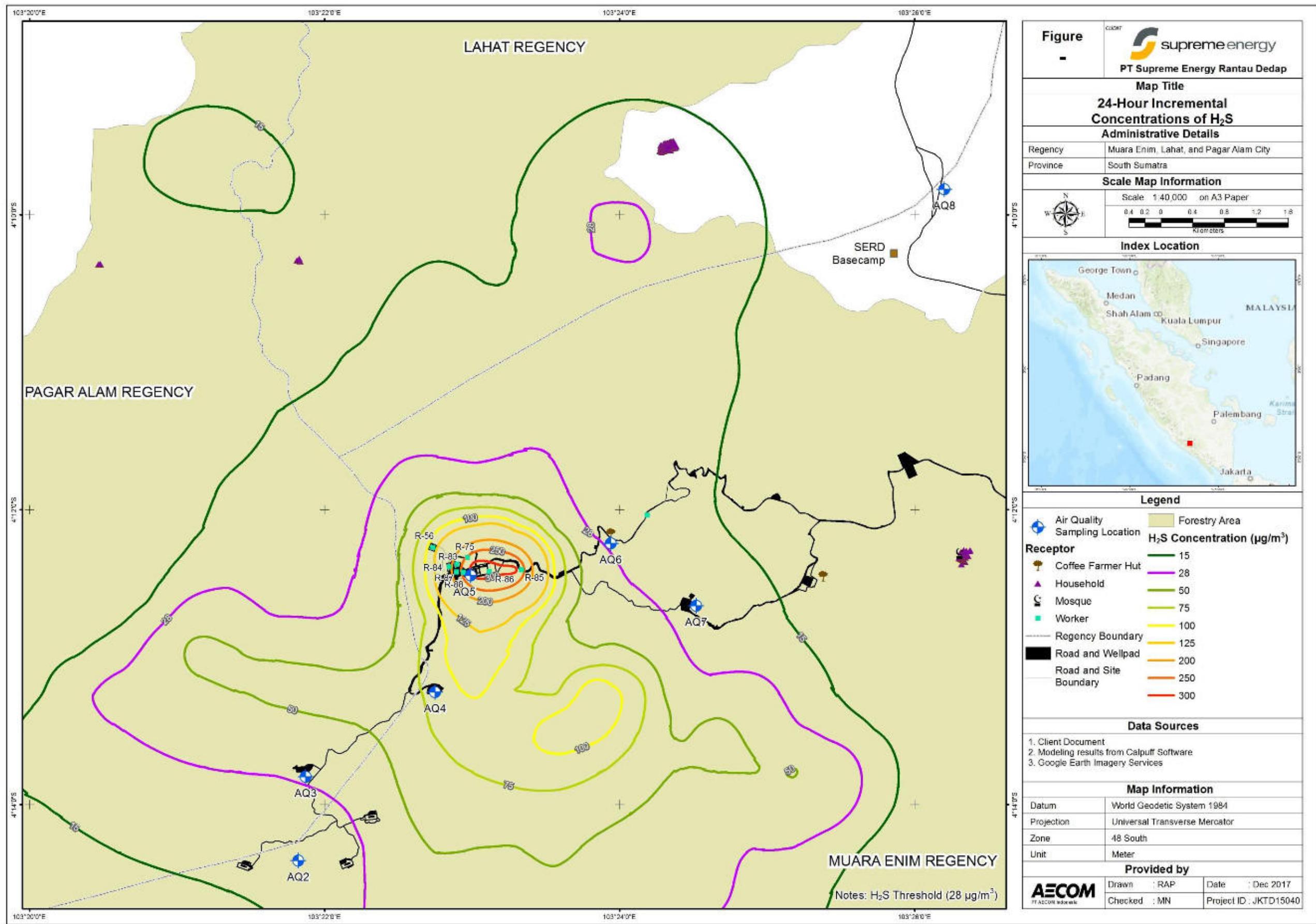


Figure 7-1 Predicted Incremental 99.9 percentile 24-hour Concentrations of H₂S ($\mu\text{g}/\text{m}^3$) within 12km x 12km Domain

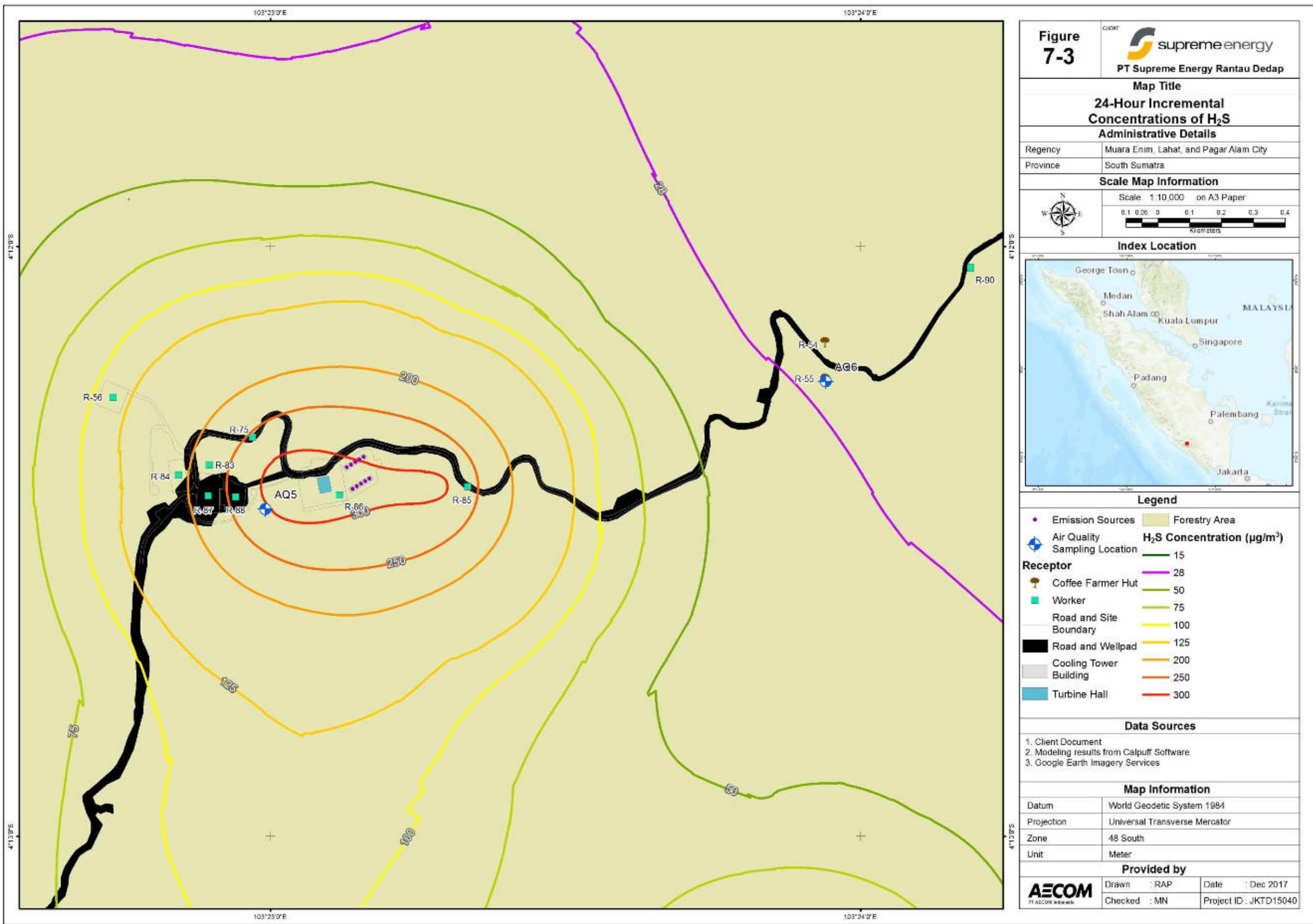


Figure 7-2 Predicted Incremental 99.9 percentile 24-hour Concentrations of H₂S (µg/m³) within 3km x 3km Domain

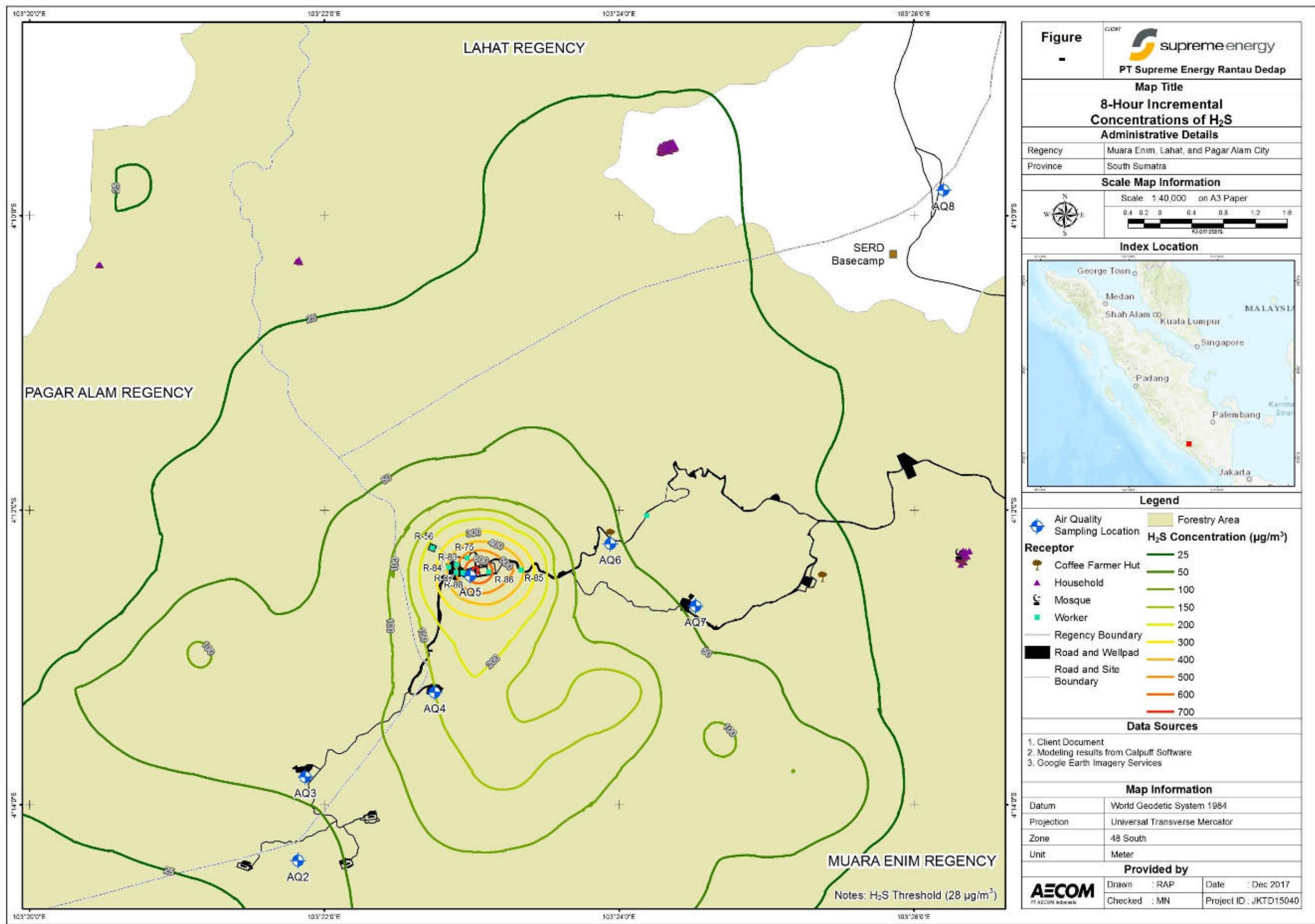


Figure 7-3 Predicted Incremental 99.9 percentile 8-hour Concentrations of H₂S ($\mu\text{g}/\text{m}^3$) within 3km x 3km Domain

8. Conclusion

AECOM has been commissioned by SERD to prepare Air Dispersion Modelling (ADM) to demonstrate compliance with applicable standards. This report is therefore to provide an assessment of the air quality impact associated with the power plant operation.

The primary air emissions of concern with regards to odor nuisance and health effects from the power plant will be the non-condensable gases (NCG). NCG are gases that are present with range of 0.09-1.6 wt% in the geothermal fluid. The NCG consist predominantly of carbon dioxide (approximately 97%), but also contains H₂S (H₂S). The NCG will be released from vents located above the mechanical evaporative cooling towers.

Based on the NCG content in the steam and H₂S content in the NCG provided by SERD, total H₂S emission was calculated 138 g/s. With this rate, the emission concentration at normal condition was estimated 17 mg/m³, still well below the Indonesian Emission Standard of 35 mg/m³.

The ADM report for the proposed SERD geothermal power plant was based on the air dispersion model Calpuff and assessed the contribution to air quality impacts at nearby sensitive receptors and representative worker receptors from the power plant. The inputs to the model include source parameters, building dimensions expected to cause downwash effect, meteorological data, topography and land use. For this study, dispersion is modelled over 12 km x 12 km domain with the power plant cooling tower is in the centre.

Based on Calpuff calculations at identified sensitive receptors, there is no exceedance of the 99.9 percentile 24-hour incremental concentrations. The maximum 99.9 percentile 24-hour concentration is predicted 25 µg/m³ at receptor number 55. The maximum incremental concentrations predicted at the other sensitive receptors are in the range 6-21 µg/m³, or less than the odor standard of 28 µg/m³.

There is an exceedance of the 99.9 percentile 8-hour incremental concentrations at one representative worker receptor. The highest predicted 8-Hour concentration is 1,878 µg/m³ at receptor number 86 located about 40 meter from the cooling tower. This concentration has exceeded the threshold value of 1,400 µg/m³ in the working environment as stipulated in the Regulation of the Minister of Employment and Transmigration Number PER.13/MEN/X/2011. However the exceedance is only 0.5% of the time. It is also unlikely that a worker would be present at this location for an entire work day. Most of the time (88%) the H₂S concentrations at this receptor is ranging from zero to 300 µg/m³.

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Appendix A Comparison between SERD Observation Meteorological Data and Calmet Simulation

Surface meteorological data were obtained from Meteorological Station installed by Supreme Energy Rantau Dedap (SERD) since 2012 at the project location. Data obtained from this station is from 2012-2015. The parameters obtained include temperature, humidity, wind speed, wind direction and rainfall. Data are available on a hourly basis. However many hours have missing values.

Because of the limitation of the observation data, hourly forecast meteorological data were also obtained from Lakes Environmental (hereinafter referred to as Lakes). Lakes is a company based in Ontario, Canada which provides provides meteorological modelling for air dispersion modelling purpose for any location in the world. Their data were results of running the next-generation Weather Research and Forecasting mesoscale model (WRF).

The meteorological data from Lakes were obtained by request via their website. The request is completed with information regarding domain to be modelled and modelling period. For this study, meteorological modelling was requested for a domain size of 50 x 50 km (with project location in the middle), 12 km grid resolution, and for the period of 2013 to 2015 with one hour data interval. The meteorological data from Lakes were generated in the 3D.DAT format outputs. For air dispersion modelling purpose, these outputs were further simulated with CALMET for a finer grid resolution. CALMET is the meteorological pre-processor for the CALPUFF model. The results of CALMET simulation were then compared to the observation data.

A further evaluation of the reasonableness of the CALMET meteorological output was conducted by comparing the model predicted meteorological parameters with the observed measurements. Note that the extracted data from the CALMET outputs are set up at the surface level, i.e., 10 m above the ground. Tabel 1 summarizes the annual averaged results and the comparisons for wind direction, wind speed and temperature.

Table 1 Comparisons of CALMET Simulation vs. SERD Observation for Annual Average Wind Directions/Speeds and Temperature

Year	Observation			Calmet Simulation			Comparison		
	WD (degree)	WS (m/s)	T (oC)	WD (degree)	WS (m/s)	T (oC)	WD (%)	WS (%)	T (%)
2013	201	2.1	17.9	202.2	2.9	18.4	0.6%	38.1%	2.8%
2014	205	2.2	18.0	188.3	2.9	18.3	-8.1%	31.8%	1.7%
2015	197	2.4	18.5	172.6	3.3	18.4	-12.4%	37.5%	-0.5%

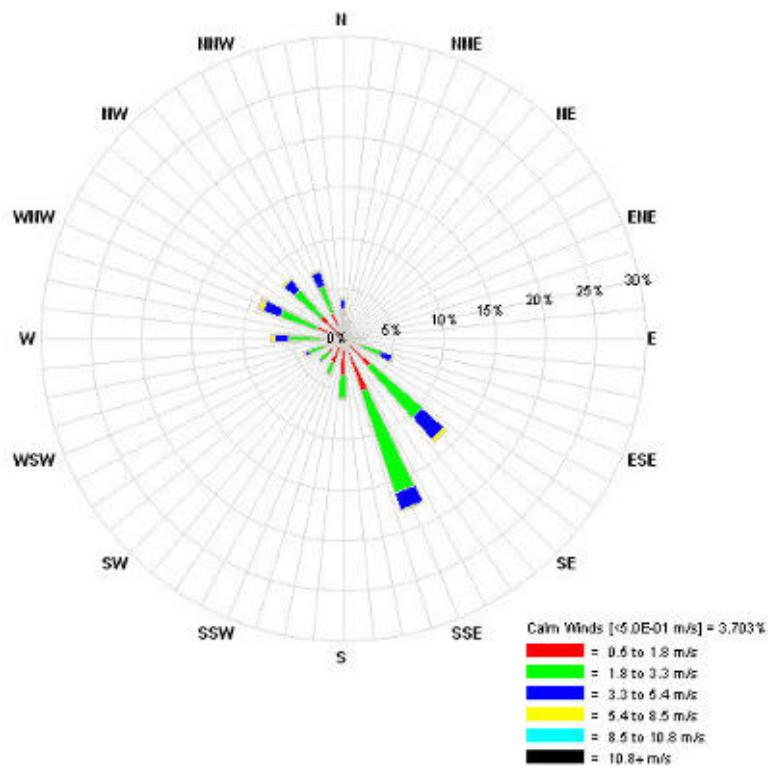
Note: WD = Wind Direction; WS = Wind Speed; T = Temperature

As can be seen in Table 1, the predicted parameter values are very close to those of the observed especially for wind direction and temperature. Only the predicted wind speeds are higher 32% to 38% than those of the observed. However these can be still considered acceptable. It can be seen that the agreement between the measurements and predictions are satisfactory.

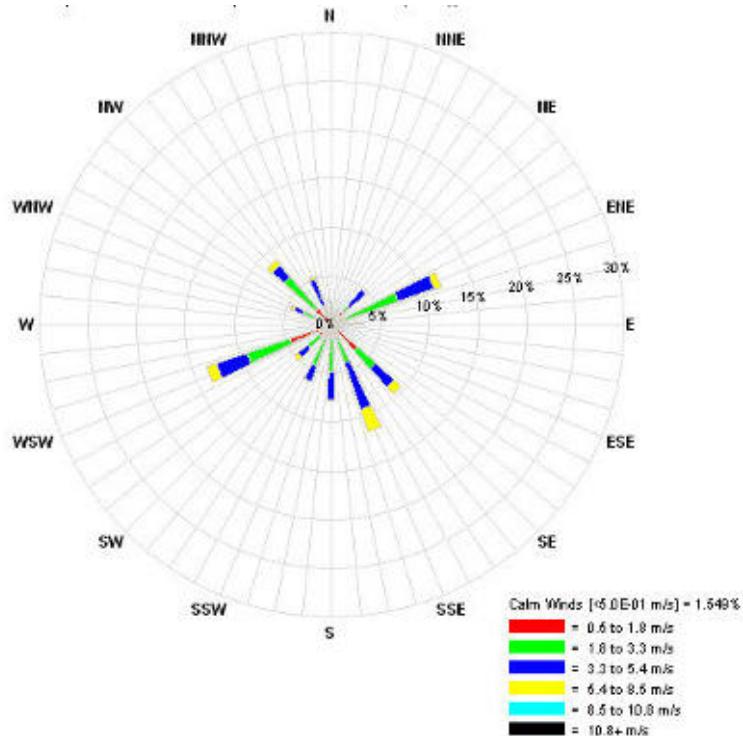
Figure 1 and Figure 2 present the wind roses from SERD observation and Calmet simulation for three year period respectively. Comparing with the observations, it is shown that the predicted wind rose is not close to the observed. However, the Calmet simulation does a reasonable job in capturing the distribution of wind directions.

From the observation data, prevailing winds in the study area are primarily from the south southeast. The Calmet simulation tends to under predict the frequency of winds from this direction and over predict the frequency of winds from west southwest and east northeast.

The average wind speeds for the observed and predicted were about 2.4 m/s and 3.3 m/s, respectively. Simulation-predicted wind speeds are slightly higher than the observed values.



**Figure 1 Wind-Rose Depicting Wind Direction Distribution Based on Calmet SERD Observation
(Period of 2013-2015)**



**Figure 2 Wind-Rose Depicting Wind Direction Distribution Based on Calmet Simulation
(Period of 2013-2015)**

Appendix B Calculation of H₂S Emission from Cooling Tower

Calculation of Emissions from Cooling Towers

The most important air quality impact associated with a geothermal power plant will be the release of non-condensable gases (NCG) into the atmosphere. The NCG will be discharged from vents located above the cooling tower fan units and be entrained within the cooling tower discharge, thereby aiding dispersion. The main component of the discharged NCG will be carbon dioxide but hydrogen sulphide (H_2S) and mercury will also be present. The latter two components are those of concern.

The H_2S emissions from the Supreme Energy Rantau Dedap (SERD) geothermal power plant will originate from the operations of two identical units of cooling tower. Characteristics of the cooling tower per unit at normal operation are presented in Table 1.

Table 1 Characteristic of the Cooling Tower (per Unit)

Item	Unit	Design
Type		COUNTERFLOW
Water flow	t/hr	13,251
Hot water temperature (Tower inlet)	oC	32
Cold water temperature (Tower outlet)	oC	19
Cooling tower size		
Length	m	111
Width	m	17
Height (working level and freeboard)	m	17
Fan		
Number of fans	-	7
Fan diameter	m	8.5
Exit temperature	C	28
Exit pressure	bar	0.8
Exit relative humidity	%	100
Exit air mass flowrate	t/hr	16,476

Source: Supreme Energy Rantau Dedap, 2017

The proponent targets their H_2S emissions to meet the emission quality standards for Geothermal Power Plant from the Government of Indonesia (GoI) or the International Finance Corporation (IFC), whichever is the more stringent. The emission standard from the GoI is 35 mg/m^3 at normal condition (temperature of 25 oC and barometric pressure of 1 atm) as stipulated in the Minister of Environmental Regulation No 21 of 2008. There is no emission standard from the IFC. In their EHS guidelines for the geothermal power plant (IFC, 2007) IFC did not specify emission standards. In the section 2.1 of this guideline IFC made a statement saying: "*hydrogen sulfide emissions, or other types of emissions, should not result in ambient concentrations above nationally established air quality standards or, in their absence, internationally recognized guidelines*". Thus for this study, the H_2S emission will be calculated based only on the GoI emission standard.

For the purpose of estimating the H_2S emission, it will be assumed a steady-state condition will be reached whereas the worst case scenario emissions will be at those limits. It is then necessary to determine the volume of the cooling tower outlet air flow at actual and normal conditions. Steps for the calculation of the cooling tower H_2S emission are as follows:

1. Calculate volume of air flow at actual condition with equation:

$$V_1 = m_{\text{air}} \times S_v, \quad \text{Equation 1}$$

Where:

V_1 = volume of exit airflow at actual condition (T_1 & P_1), m^3/s

m_{air} = mass flowrate of exit air, kg/s

S_v = specific volume of exit airflow at actual condition (T_1 & P_1), m^3/kg

The value of S can be obtained from the psychometrics chart according to ANSI/ASHRAE Standard 41.6-1994. This chart shows air-vapour properties including specific volume based on air barometric pressure, dry bulb temperature and relative humidity. The values for these three parameters are provided in Table 1.

2. Calculate volume of airflow at normal condition with equation:

$$V_2 = V_1 \times (T_2/T_1) \times (P_2/P_1) \quad \text{Equation 2}$$

Where:

V_2 = Volume of exit airflow at normal condition, m^3/h

T_1 = Temperature of airflow at actual condition, K

T_2 = Temperature of airflow at normal condition, K

P_1 = Pressure of airflow at actual condition, bar

P_2 = Pressure of airflow at normal condition, bar

3. Calculate mass flow rate of H_2S emission to meet the Gol emission standard with equation:

$$EH = ES * V_2 / 1000$$

Where:

EH = mass flowrate of H_2S emission, g/s

ES = H_2S emission standard of the Gol, mg/m^3

The result of each step is presented in Table 2.

Table 2 Results of Systematic Estimation of H_2S Emission from Cooling Tower

Item	Value	Unit
T_1	301.15	K
P_1	0.8	bar
T_2	298.15	K
P_2	1.01	bar
S_v	1.11	m^3/kg
m_{air}	653.81	kg/s
V_1	723.26	m^3/s
V_2	794.05	m^3/s
ES	17	mg/m^3
EH	9.88	g/s

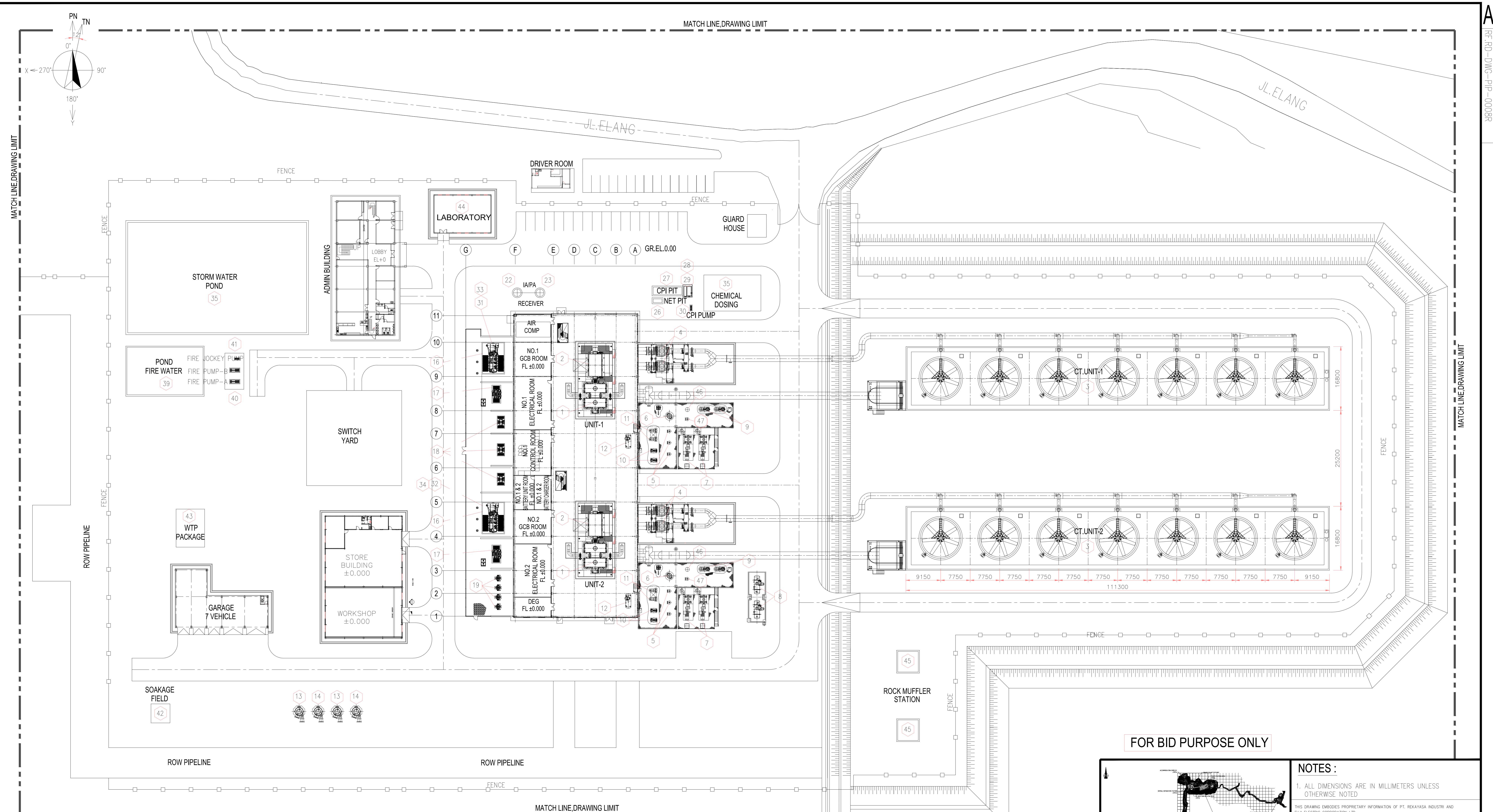
Note: These calculations represent one unit of cooling tower fan

Appendix C Index of Sensitive Receptors

Receptor ID	Easting (km)	Northing (km)	Elevation (m)
1	323.081	9,540.194	1,351
2	323.069	9,540.189	1,351
3	323.054	9,540.186	1,352
4	323.040	9,540.185	1,352
5	323.030	9,540.179	1,356
6	323.086	9,540.176	1,350
7	323.012	9,540.172	1,350
8	323.003	9,540.171	1,348
9	322.982	9,540.169	1,348
10	322.965	9,540.162	1,344
11	322.958	9,540.162	1,344
12	323.061	9,540.157	1,353
13	323.053	9,540.157	1,353
14	323.032	9,540.155	1,350
15	323.016	9,540.146	1,346
16	322.924	9,540.145	1,342
17	322.998	9,540.144	1,344
18	322.983	9,540.143	1,344
19	323.068	9,540.137	1,345
20	322.974	9,540.136	1,344
21	323.112	9,540.134	1,347
22	322.925	9,540.133	1,342
23	323.048	9,540.131	1,349
24	323.037	9,540.131	1,349
25	322.959	9,540.130	1,343
26	322.953	9,540.127	1,343
27	323.022	9,540.124	1,346
28	323.107	9,540.123	1,347
29	323.013	9,540.122	1,346
30	322.997	9,540.115	1,345
31	323.096	9,540.112	1,345
32	323.079	9,540.109	1,345
33	322.921	9,540.109	1,344
34	322.976	9,540.105	1,345
35	322.963	9,540.103	1,343
36	323.067	9,540.102	1,345
37	322.945	9,540.101	1,343
38	322.985	9,540.087	1,345
39	322.927	9,540.086	1,344
40	323.003	9,540.085	1,345
41	322.972	9,540.082	1,347
42	323.045	9,540.080	1,345
43	322.911	9,540.069	1,348
44	322.958	9,540.067	1,347
45	322.931	9,540.053	1,348
46	318.413	9,538.701	1,240

47	318.388	9,538.715	1,240
48	318.357	9,538.693	1,243
49	318.377	9,538.693	1,243
50	318.398	9,538.682	1,240
51	315.891	9,538.642	1,247
52	315.869	9,538.639	1,249
53	315.897	9,538.634	1,247
54	322.302	9,535.285	1,683
55	322.302	9,535.171	1,692
56	320.070	9,535.108	1,996
57	326.732	9,535.088	1,595
58	326.813	9,535.084	1,583
59	326.766	9,535.078	1,593
60	326.806	9,535.074	1,588
61	326.761	9,535.061	1,593
62	326.698	9,535.060	1,597
63	326.728	9,535.048	1,594
64	326.682	9,535.042	1,599
65	326.746	9,535.040	1,594
66	326.756	9,535.039	1,591
67	326.714	9,535.025	1,597
68	326.727	9,535.019	1,593
69	326.789	9,535.012	1,584
70	326.706	9,535.009	1,596
71	326.725	9,535.003	1,593
72	326.735	9,534.996	1,593
73	326.754	9,534.994	1,587
74	326.672	9,534.985	1,592
75	320.506	9,534.984	2,000
76	326.693	9,534.978	1,594
77	326.704	9,534.973	1,594
78	326.715	9,534.968	1,594
79	326.725	9,534.963	1,589
80	326.735	9,534.962	1,589
81	326.747	9,534.942	1,589
82	326.704	9,534.911	1,590
83	320.371	9,534.897	2,008
84	320.274	9,534.866	2,023
85	321.182	9,534.831	1,929
86	320.780	9,534.804	1,960
87	320.368	9,534.801	2,012
88	320.455	9,534.797	2,007
89	324.967	9,534.756	1,687
90	322.758	9,535.518	1,640

Appendix D Power Plant Layout



FOR BID PURPOSE ONLY

EQUIPMENT LIST

ITEM	DESCRIPTION
1	STEAM TURBINE
2	GENERATOR
3	COOLING TOWER
4	HOT WELL PUMPS
5	STEAM EJECTORS
6	INTER CONDENSER
7	LIQUID RING VACUUM PUMPS
8	CLEAN, DIRTY LUBE OIL STORAGE TANKS
9	PRIMARY AUX. COOLING WATER PUMPS
10	SECONDARY AUX. COOLING WATER PUMPS
11	PRIMARY SECONDARY WATER HEAT EXCHANGERS
12	COOLING WATER HEADER TANK
13	HIGH PRESSURE SCRUBBERS

EQUIPMENT LIST

ITEM	DESCRIPTION
14	LOW PRESSURE SCRUBBERS
15	
16	GENERATOR TRANSFORMER
17	AUXILIARY TRANSFORMER
18	SERVICE TRANSFORMER
19	LIGHTING TRANSFORMER
20	AIR COMPRESSOR
21	DRYER
22	INSTRUMENT AIR RECEIVER
23	SERVICE AIR RECEIVER
24	
25	
26	NETRALIZING PIT

EQUIPMENT LIST

ITEM	DESCRIPTION
27	CPI
28	OIL SEPARATOR
29	CPI FEED PUMP
30	CPI OUTLET PUMP
31	TRANSFORMER OIL POND UNIT-1
32	TRANSFORMER OIL POND UNIT-2
33	TRANSFORMER OIL PUMP UNIT-1
34	TRANSFORMER OIL PUMP UNIT-2
35	CHEMICAL DOSING PACKAGE
36	STORM WATER POND
37	
38	
39	FIRE WATER POND

NOTES :

. ALL DIMENSIONS ARE IN MILLIMETERS UNLESS
OTHERWISE NOTED

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The logo for Supreme Energy features a stylized 'S' composed of two overlapping curved bands, one grey and one yellow. To the right of the 'S', the word 'supreme' is written in a bold, lowercase, sans-serif font, and 'energy' is written in a smaller, lowercase, sans-serif font.

RANTAU DADAP GEOTHERMAL POWER PLANT PROJECT
DRAWING TITLE : BLOK PLAN

PLOT PLAN FOR POWER STATION AREA

SCALE : 1:500		
PROJECT NO.	CONTRACTOR DRAWING NO.	REVISION NO.

Rantau Dedap Geothermal Development

Assumptions for investment evaluation

Technical Assumptions of Steam and Power Plant	Value	Value	Unit	Comment	Source
Annual operating hours	8,760	8,760	h/y		
Gross Installed Capacity	92	98.40	MW		Enquiry Document
Net Installed Capacity	87	90.90	MW		Enquiry Document
Total steam flow					
HP	59.5	64.14	kg/s		Enquiry Document
	214	231	ton/h	calculation	
LP	31.0	31.0			Enquiry Document
	112	112	ton/h	calculation	
NCG					
HP	1.190	1.283	kg/s	NCG 2% in total steam flow	Enquiry Document
LP	0.446	0.446	kg/s	NCG 2% in total steam flow	Enquiry Document
Total NCG	1.636	1.729		calculation	
CO2 in NCG	1.358	1.435	kg/s	Average 83%	Enquiry Document
CH4 in NCG	0.005	0.005	kg/s	Average 0.3%	
Production lifetime	30	30	y		PPA
Take or Pay (ToP)	90%	90%	%		PPA
Gross electricity generation	725,328	775,786	MWh/y	calculation	
Net electricity generation	681,966	716,656	MWh/y	calculation	
Emission factor of the Sumatera Grid	0.724	0.724	tCO2/MWh		Directorate General of Electricity and Energy Utilization Letter No 494/21/650.1/2009

Emission Reduction of Rantau Dedap Geothermal Power Plant
ACM0002 version 12.1.0 Consolidated baseline methodology for grid connected electricity generation from renewable sources

BASELINE EMISSIONS

Electricity supplied by the project activity to the Grid in year y

$EG\ PJ,y = Net\ Installed\ Capacity * TOP * Operating\ Hour$

EG PJ,y	716,656	MWh/y
Net Installed capacity	90.9	MW
TOP	90%	
Operating Hour	8,760	h/y

Baseline Emission

$$BE_y = EG_{PJ,y} \cdot EF_{grid,CM,y}$$

BE y	518,859	tCO2/y
EG PJ,y	716,656	MWh/y
EF grid,y	0.724	tCO2/MWh

PROJECT EMISSIONS

Project emissions due to the release of NCG from produced steam

$$PE_{GP,y} = (W_{steam,CO2,y} + W_{steam,CH4,y} \cdot GWP_{CH4}) \cdot M_{steam,y}$$

PE GP,y	43,827	tCO2/y
W steam, NCG	1.82%	
W NCG, CO2	88.0%	
W NCG, CH4	0.3%	
W steam, CO2, y	0.01509	tCO2/tsteam
W steam, CH4, y	0.0001	tCH4/tsteam
Steam flow rate	342.50	t/h
M steam,y	2,700,302	tsteam/y
GWP CH4	21	tCO2/tCH4

Project emissions due to combustion of fossil fuel

$$PE_{FF,y} = PE_{FC,j,y}$$

PE FF,y	0	tCO2/y
FC i,j,y	0	kg
Fueltype	diesel	
NCV i,y	0.043	GJ/kg
EF CO2,i,y	0.0748	tCO2/GJ

Project Emissions

$$PE_y = PE_{FF,y} + PE_{GP,y}$$

PE y	43,827	tCO2/y
PE FF,y	0	tCO2/y
PE GP,y	43,827	tCO2/y

EMISSION REDUCTION

Total Project Emissions

$$ER_y = BE_y - PE_y$$

ER y	475,031	tCO2/y
BE y	518,859	tCO2/y
PE y	43,827	tCO2/y

CO2 Rantau Dedap

Unit 1&2

1/1/2020

Years		BE y [tCO2/y]	PE y (tCO2/y)	ER y [tCO2/y]
1	2020	518,859	43,827	475,031
2	2021	518,859	43,827	475,031
3	2022	518,859	43,827	475,031
4	2023	518,859	43,827	475,031
5	2024	518,859	43,827	475,031
6	2025	518,859	43,827	475,031
7	2026	518,859	43,827	475,031
8	2027	237,810	20,088	217,723
Total		3,869,821	326,879	3,542,941
Average		557,832	46,697	506,134