

9/6/2010



Barry Wallerstein, Executive Officer
Veera Tyagi, Deputy District Counsel II
Steve Smith, Program Supervisor
South Coast Air Quality Management District
21865 Copley Drive, Diamond Bar, CA 91765

Re: Warren neighbors concerns about Warren E&P Inc. WTU and additional impacts left out of the Negative Declaration

Dear Mr. Wallerstein, Ms. Tyagi, and Mr. Smith:

We understand that you are in the process of making the decision about Warren oil drilling operations, and whether to certify the draft Negative Declaration on the Warren E&P Inc. WTU Central Facility New Equipment Project. As we discussed at our meeting on July 28, 2010, we want to report the observations of neighbors regarding the ongoing problems they are experiencing living near this facility, and suggest a few additional reasons why an EIR is required and so important to neighbors. **We want to emphasize how severe the problems are for the neighbors, and why an expansion is even more problematic.**

First, as we wrote in our previous comments, an EIR for Warren's new Project is required because of the many significant impacts of the Project itself, and the inherent connection between the new Project and ongoing operations. Warren will not be able to process increased gases generated by drilling additional wells without the new flare, microturbines, and other equipment evaluated in the Negative Declaration, as acknowledged by Warren in its application documents. Thus, in addition to the significant impacts of the new equipment, the entire facility's operations should also have been evaluated in a full EIR.

Furthermore, only ongoing emissions were evaluated, but upset conditions are real, can be anticipated, and must be evaluated under CEQA and the Clean Air Act. The Negative Declaration incorrectly states, without any basis, no impact from upset conditions. (Neg. Dec., pp. 2-31; see discussion below).

We urge you to use your authority to scrutinize the impacts of this facility and solve these problems, rather than abandon it as a bad siting decision by the City of Los Angeles. The AQMD still has the responsibility to fully evaluate the impacts of the new project, and the responsibility to solve the severe public nuisance problems.

The New Project is inextricably connected with the facility's drilling operations

Although the AQMD has stated to us that it considers the new flare and other equipment evaluated in the Negative Declaration to be separate from Warren's oil drilling operations, in fact, these are inextricably connected. Warren is at a point in its operations where without the new equipment, it will not be able increase its oil drilling (which generates large volumes of gases) without the new equipment. Thus the new equipment is a debottlenecking point for the entire facility's operations, which should all have been considered in the negative declaration.

In the attached pdf document¹ provided to us by the AQMD from Warren's application materials for the new project, Warren representatives stated specifically that once an oil well is drilled, the gas volume will climb and combine with the gas from other wells. They also stated that the only current option is to burn the gases in a combination of process heaters, microturbines, and the flare. (The reference to "current" presumably refers to the discussions that Warren could sell gases in the future only if production increases many times the current volume.) Warren states:

- Even though the produced gas is of excellent quality Exxon did not have and Warren does not have the ability to control the btu content of this gas. The only current option is to burn it in a combination of process heaters, microturbines, and the flare.
- Likewise, Warren does not have the ability to directly control the daily rate of gas produced. Once a given oil well is turned on the amount of gas produced will climb gently and combine with gas from other wells. The rate of climb is erratic and never predictable with any certainty on an hourly or even a daily basis. But, over a month's time there is certainty that an average-based permit limitation can be achieved.

This same document contains another letter from Warren:²

Over the last several months Warren has been fully evaluating our operations and future flare needs at our Wilmington Townlot Unit (WTU). Warren is aware that both the District and Warren must respond to neighborhood environmental concerns. Last December we placed an order to purchase six Ingersol-Rand Model 70 Microturbines (permit exempt under Rule 219) for the purpose of using flare gas to generate a portion of our electric needs. These microturbines are virtually completed and should begin startup in mid-September. When they are fully operational the amount of produced gas burned in the existing flare will diminish substantially. As you know, the emissions from these new microturbines will be much less than from the existing flare.

Meanwhile, as Warren increases its oil production in response to today's increasing demand, the amount of produced gas increases in direct proportion. Our produced gas rate will climb in the next year to the point where the existing flare will again approach its capacity. As such, Warren now believes that the time has come to replace the existing flare with a new technology flare that meets BACT, has less emissions, and reduces the visual impact on our residential neighbors. The flare we are planning to install is described in the attached vendor documents. According to the vendor we can expect delivery of the flare system within approximately 12 to 18 weeks after order placement. Final installation and startup may take an additional 4 weeks.

¹ Warren Application materials compiled into a pdf and provided to CBE by the AQMD ("PDF"), attached. PDF, p. 2, Herb Morgan, Warren E&P, email to Marcel Saulis.

² PDF, p. 168, September 4th, 2007, letter to Marcel Saulis from Stephen Heiter, Warren E & P.

Finally, in another Warren email in this same document, Warren states that they are above their permit limits for the flare, and will have to evaluate slowing down on new well drilling in order to deal with the gases generated:³

Meanwhile, be aware that the flare permit rate is limited to 4.0 mmbtu/hr (not in mcf/d). My previous guesstimate of the fuel gas burned in the HT is 30.1 mcf/d. Subtracting that number from your 170 mcf/d yields 139.9 mcf/d going to the flare. At 968.57 btu/cf (six month average of gas analysis data) that yields a btu rate to the flare of 5.64 mmbtu/hr which exceeds the permitted allowable. In other words, if the calculations are correct, we are exceeding the current limit.

Beyond these "bookkeeping" issues, we need to be developing our thinking on broader issues such as selling the gas offsite, slowing down on new well drilling, firing the HT at higher rate to get rid of btu's, reinstalling the idle hot water heater to burn up btu's, injecting gas to the formation, etc.

Health and Quality of Life Impacts:

Community members living in close proximity to Warren E & P's Townlot site asked us to relay the harmful effects Warren's operations are having on them. They gave us their statements last week, and also wanted us to let you know that these problems are recurring, and were not simply caused by the initial construction phase of the Project a couple of years ago. They are evidence that the neighbors cannot tolerate any further expansion of the facility.

Common symptoms and impacts include: nausea; asthma and allergy exacerbation; eye, skin, and nose irritation; itching, and burning; headaches; strong rotten, fishy, chemical odors; oily residue; dust; bright lights into bedrooms; deterioration of house and outdoor plants; and, explosive noises. In the last two weeks, neighbors reported these problems in writing to Alicia Rivera, CBE Community Organizer. Below are the comments, in their own voices:

- *Noticed Dust...very sticky. It sticks to the window and this affects my daughter. Causes health problems.* (Margarita Garcia)
- *Strong, and frequent rotten odor. Noise from the plant and the workers who yell. Vibration. Black, greasy dust that stays on the cars and the [house] walls.* (Francisco Vargas)
- *The pipes sound very loud. They thunder when they fall to the ground. The steel that falls from above also makes noise. They work day and night. This affects us mostly at night; the workers [at the plant] yell at night. The cars and [house] windows get covered with greasy dust. The strong gas odor causes headaches. My 6-year-old son has asthma.* (Rafael Hernandez)
- *Smell of gas, like that from a stove. Strong odor like that of a dead dog...that dissipates quickly. My [house] window is directly in front of Warren. I keep it close due to the smell. This is what bothers me the most. Warren devalues my property, and affects our health. I am afraid if there is an emergency, such as an earthquake. **How will AQMD help us from danger?*** (Eva Caldera)
- *The bad odor in the morning at 6 a.m. The noise that is there most of the time, and which affects us when we sleep. And the air that comes directly in my direction on Lecourreur.* (Cristina Hernandez)

³ PDF, p. 198, August 29, 2006, email from Herb Morgan to Robert Perkins.

- *Strong smell of gas that penetrates my bedroom. I need to turn on the air conditioner to dissipate the smell. My husband has difficulty breathing because he has asthma. (Yolanda Rico)*
- *Its smells bad at night like fish oil and rotten eggs. I have had to close my windows in the middle of the night because of the intense gas odor. (Jose Marquez)*
- *Strong annoying odor at night. I feel itching on my eyes, allergy... I also hear a lot of noise at night. (Celia Alvarez)*
- *I have noticed certain odors that come from the Warren plant. I have also notice an increase [of the odor] during work hours. There is constant noise and dust that comes from the [plant] area, and this is causing a lot of restlessness in my home. (Jose Luis Hernandez)*
- *Noise, dirt, dirty oil, and bad odor. (Laura Callejas)*
- *Constant noise, odor that smells of gas or fish, and dust. The odor was strong once that it caused me migraine headache, and made me feel nauseated. My throat gets dry and grasping in the early morning. The noise of banging metal is extremely exasperating and hard to put up with. It raises the stress level. (Juana De Lara)*
- *Bad, fish-like, odor...The plants have deteriorated since Warren has operated in the vicinity because they are covered with a whitish/grayish dust. (Rosalinda Galeano)*
- *Strong odor of dried gas. Noise from steel being moved from one place to another. High lights that penetrate my bedroom. Greasy dust that sticks to the windows (of the house) and the plants. (Flor de Maria Argueta)*
- *Smell of gas when I go by Warren on Eubank. My nose is very sensitive and feels the smell of gas right away. (Rosalba Venezco)*
- *Once operation began, my family suffered from allergies. Itchy eyes, swollen and discomfort to the face. Scratchy throat. The soot from Warren continues to fall on our plants and house [and car] leaving an oily residue.... Odors continue (such as a burned oil-chemical smell...hard to describe) mainly at night. (Esther Martinez)*
- *Noise, chemical smells, vibration when something falls, [b]ig lights. (Reyna Aguilar)*
- *My house gets really dusty. Often smells like gas... a strong smell that is difficult to describe. I have noticed that [my] allergies have worsened and at times I've woken up with a burning sensation in my nose. Also...my car is dirty after I have washed it. (Jennifer Castillo)*
- *Since I moved across from Warren [1 year ago], my 9-year-old son's allergies have worsen, and he is suffer from asthma. The smell like chemical is stronger at night.... My children suffer from chest cold and respiratory problems. (Griselda Alvizar)*
- *Loud noises, gas, odor when I walk my child by that area. It smells bad and it concerns me because the odors can affect my child's health. (Jazmin Montero)*
- *A bright light outside my bedroom disrupting my sleep. I have also...awaken to big thumps in late and early hours. (Ashley Harnandez)*
- *They are very loud at nighttime. Sometimes I awaken to very loud sounds. They also have a bright light that hits my window. There is sometimes a bad odor. The windows have dust. (Maira Castellanos)*
- *Flares are too close to houses. (Pedro Velazquez)*

Neighbors also added that in the past they noticed:

- *Noise and bad odors.* (Margarita Garcia)
- *Stronger odor and more noise. Lots of dust and traffic.* (Francisco Vargas)
- *When I am sleeping at home I can hear the yells and screams [of the plant workers], and the tubes and the gas odor.* (Rafael Hernandez)
- *The odors and the noise...noise that sounds as if something has exploded or crashed.* (Eva Caldera)
- *In my family, we have severe allergies in the eyes, nose, and most of the body. It is most severe on my 12-year-old daughter. We lack information about what to do in case of emergency. We wake up tired due to headaches* (Cristina Hernandez)
- *Hammering noise, pounding, and smoke* (Yolanda Rico)
- *I have experienced more intense odors. A lot of dust and also loud noise....like explosions.* (Jose Marquez)
- *I have felt this fish odor...that makes me vomit. It takes away my appetite because I feel nauseous.* (Celia Alvarez)
- *On my property, I have felt a lot of trembling caused by the movement of the machinery [at the plant]. I have seen lots of things on my property, like certain damages caused on the windows, the walls, and the bathrooms.* (Jose Luis Hernandez)
- *Lots of dirt and allergies. Also my eyes are irritated and I have had headache.* (Laura Callejas)
- *The noise, the dust, the smells were so strong that my children did not want to eat because the smell made them feel nauseated. The 24 hr. operation were hard. The noise from traffic.* (Juana De Lara)
- *The smell is what bothers me the most. A truck from Warren damaged the cable into my house, and it has never been repaired.... Although they told me they were going to fix it.* (Rosalinda Galeano)
- *Damage to the windows. Unevenness of the soil. Noise that is 24 hours. Heavy, thick, black dust that sticks to the furniture, the house walls that keeps them dirty. The majority of the floor is cracked.* (Flor de Maria Argueta)
- *Noise at night. The metal bangs as if it is falling with force.* (Rosalba Venezco)
- *Noise, tar smell.* (Reyna Aguilar)
- *In the past few years ...there was lots of shaking of the windows, a lot of noise. Still to this day there is noise and all the windows in the house still shake.* (Jennifer Castillo)
- *The plants and car covered with a black oily suit [soot] that continues till today along with odors.* (Esther Martinez)
- *Allergies, redness in eyes, a lot of dust flying around,...oil on my vehicles in the morning.* (Pedro Velazquez)
- *Smells which caused me strong migraines and vomiting and nausea. Odor like gas but it's difficult to describe, or rotten mud. Cracks in my wall and some sinking in the front [unreadable].* (Carmen Rangel)

- *My son's asthma worsen since we live at this address [1 year].* (Griselda Alvizar)
- *Loud dropness of pounding.* (Jazmin Montero)
- *Most of all the noise quality that deprives us of our sleep.* (Ashley Hernandez)

Several community members also asked Ms. Rivera to take photographs of the rashes around their eyes, and to show these photographs to you. They stated that these were caused by the Warren facility emissions. Eye impacts are consistent with chemical emissions from oil drilling operations. Two photos are below:



These impacts are consistent with the impacts of chemicals known to be emitted by oil drilling operations. **For example, according to the Agency for Toxic Disease Registry, neighbors near oil drilling facilities may be exposed to higher levels of hydrogen sulfide.**⁴ The USC Keck School of Medicine found that neighbors downwind of lower level Hydrogen Sulfide gases suffered from the following:⁵

Hydrogen sulfide (H₂S) above 50 parts per million (ppm) causes unconsciousness and death. **Lower doses of H₂S and related gases have been regarded as innocuous, but the effects of prolonged exposure have not been studied. This study was designed to determine whether people exposed to sulfide gases as a result of working at or living downwind from the processing of "sour" crude oil demonstrate persistent neurobehavioral dysfunction. Thirteen former workers and 22 neighbors of a refinery complained of headaches, nausea, vomiting, depression, personality changes, nosebleeds, and breathing difficulties. Their neurobehavioral functions and a profile of mood states (POMS) were compared to 32 controls, matched for age and educational level. The exposed subjects' mean values were statistically significantly abnormal compared to controls for two-choice reaction time, balance (as speed of sway), color discrimination, digit symbol, trail-making A and B, and immediate recall of a story. Their POMS scores were much higher than those of controls. Visual recall was significantly impaired in neighbors, but not in ex-workers. It was concluded that neurophysiological abnormalities were associated with exposure to reduced sulfur gases, including H₂S from crude oil desulfurization.** [emphasis added.]

Other sulfur compounds may also be present. For example, the compound carbon disulfide is a severe irritant of the eyes, skin, and mucous membranes.⁶ We urge the AQMD to investigate the health impacts that the neighbors are experiencing, to add monitoring and controls to solve this problem, and to fully evaluate the potential that these impacts will increase, through a full EIR.

Additional impacts not evaluated in the Negative Declaration include upset conditions

The Negative Declaration came to a nonsensical conclusion that there is no potential for significant increase in impacts due to upset conditions from the Project. It finds that even though there will be more hazardous materials present at the facility due to the new Project, simply because there was some amount present in the past of the same hazardous materials (a lower amount), there is no new risk of upset. Not only did it fail to find a significant impact, it found, without evaluation, that there would be no impact. This is not a logical conclusion and in fact the opposite conclusion must be reached. Because of the large increase in production, there will

⁴ ATSDR ToxFAQs on Hydrogen Sulfide, attached and available at <http://www.atsdr.cdc.gov/tfacts114.pdf>.

⁵ *Hydrogen sulfide and reduced-sulfur gases adversely affect neurophysiological functions*. Kilburn KH, Warshaw RH. University of Southern California School of Medicine, Environmental Sciences Laboratory, Los Angeles, USA. Toxicol. Ind. Health. 1995 Mar-Apr;11(2):185-97. <http://www.ncbi.nlm.nih.gov/pubmed/7491634>.

⁶ Occupational Safety and Health Guideline for Carbon Disulfide, <http://www.osha.gov/SLTC/healthguidelines/carbondisulfide/recognition.html>

also be a large increase in hazardous materials (such as hydrogen sulfide) onsite. Upset conditions that must be anticipated to occur will cause significantly increased volumes of hazardous materials to be processed; these definitely have the potential to cause increased hazardous materials to be released. Especially given the already severe problems for neighbors, such increases are extremely worrisome, and must be considered significant given the already-unacceptable conditions.

The wrong and baseless conclusion of the Negative Declaration was made without any evaluation:

*All of the hazardous materials being used at the site for this proposed project have been used on the site in the past. **Although the total amount of materials may increase, there are no new hazardous materials being introduced to the site. Thus, there is no new risk of upset.*** (Neg. Dec., p. 2-33.)

The attached document - *Preferred and Alternative Methods for Estimating Air Emissions from Oil and Gas Field Production and Processing Operations*, September 1999 - identifies many different emission source points from oil drilling operations, including from upsets.⁷⁸ Process upsets were identified in this document:

Drilling operations are a significant source of short-term air pollutant emissions, which some states consider to be a temporary source. During drilling, gas may seep into the well bore and become dissolved or entrained in the drilling mud (EPA, 1977a). The gases are separated from the mud in a separator or degasser. Gases removed from the mud are either vented to the atmosphere or routed to a flare. Some states or local agencies may consider mud degassing a temporary source of emissions. Pollutants of concern are H₂S, CH₄, VOC and HAPs. The use of oil-based drilling muds also results in additional H₂S, CH₄, VOC and HAP emissions. When using oil-based drilling muds, the mud will be dispersed in oil rather than water. When the mud passes through the shale shaker, the oil vapors are exposed directly to the atmosphere (EPA, 1977a). Some state or local agencies may consider this a temporary source of emissions.

. . . Waste pits storing hydrocarbon laden cuttings may be a source of VOC and HAP emissions. Well blowouts, although infrequent, are considered process upsets and can also be a source of VOC, HAP, and CH emissions. Well testing can result in VOC, HAP and CH emissions.

Emissions from gas/liquid separation processes include fugitive VOC and HAP from valves and fittings and from any operation upsets, such as pressure relief device releases due to overpressure. . . .

Emissions resulting from flashing are impacted by the change in pressure to which the entrained gases are subjected as well as the volume, temperature, and composition of the

⁷ Either due to the almost a tripling of production from 3,000 to 8,000 barrels per day proposed by the Project, or possibly due to a separately proposed lower but substantial increase from about 3,000 bbls to 5,000 barrels per day proposed by the AQMD as a compromise.

⁸ <http://www.epa.gov/ttnchie1/eiip/techreport/volume02/ii10.pdf> .

material being transferred. Flash losses occur from tanks, gun barrels, and separators, as the fluid moves from the high pressure lines to atmospheric pressure. Under high pressure, the fluid can readily dissolve more gases. As pressures are released from the saturated fluid, the dissolved gases will be released (TNRCC, 1996). All other factors being equal, the greater the pressure drop, the greater the gas volume released per barrel of oil produced (Boyer and Brodnax, 1996). The composition of the fluid will also impact emissions.

Among other things, the District has never evaluated emissions from pressure changes, pressure relief device liftings, and other upsets that are known to occur at oil drilling operations. These have the potential to cause large releases of hazardous materials and criteria pollutants, and must be evaluated.

U.S. EPA determinations and guidance interpreting federal regulatory definitions make it clear that startup, shutdown, and malfunction emissions must be included in the potential to emit for new projects. Since CEQA goes beyond this and requires that all significant impacts be evaluated, there is no doubt that such emissions should have been evaluated for this project. For example, in a separate case, the U.S. EPA objected to a Prevention of Significant Deterioration permit for failure to fully take into account such emissions in Title V permitting. In addition, the U.S. EPA stated that “regulations do not provide exemptions for excluding startup emissions from a facility’s Potential to Emit (PTE).”⁹ The agency issued the following guidance to states:

*The consensus is that for the purposes of determining PTE in the New Source Review (NSR) and Title V programs, EPA has no policy that specifically requires exclusion of “emergency” (or malfunction) emissions. **Rather, to determine PTE, a source must estimate its emissions based on the worst case scenario taking into account startups, shutdowns, and malfunctions.***¹⁰

According to a study published by Harvard Medical School, accidents and leaks from oil extraction contribute the most heavily to environmental damage, so it is especially important that these be evaluated for the Project:¹¹

Oil, A Life Cycle Analysis of its Health and Environmental Impacts

In much of the world, it is these smaller scale pipeline accidents and leaks, in conjunction with the leaks and discharges from the extraction and refining processes, that contribute most heavily to environmental damage.

⁹ U.S. EPA Comments on the Draft Prevention of Significant Deterioration (PSD) Permit, AP-5873, to Construct at Medicine Bow Fuel and Power’s Industrial Gasification and Liquefaction Plant, August 4, 2008.

¹⁰ Letter From Steven C. Riva, U.S. EPA to William O’Sullivan, Division of Air Quality, N.J. Dept. of Environmental Protection, February 14, 2006, attached and available at <http://deq.state.wy.us/eqc/orders/Air%20Closed%20Cases/09-2801%20Medicine%20Bow%20Fuel%20&%20Power,%20LLC/Sierra%20Club.Motion%20for%20Partial%20Judgment.Exh.1.pdf>.

¹¹ Edited by Paul R. Epstein and Jesse Selber, The Center for Health and the Global Environment, Harvard Medical School, March 2002, <http://chge.med.harvard.edu/publications/documents/oilfullreport.pdf>.

At every point along this chain there are leaks and spills of crude oil or petroleum products. The transfer of oil from the wells to storage tankers, from storage tankers to supertanker, from supertankers to storage tankers or tank barges, from storage tankers to truck tankers, etc. can all entail oil spillage. In addition to leaks and spills, pipeline fires and blowouts occur. Pipelines carry oil and gas all over the world, and are able to function 24 hours a day, under any weather conditions. Because of this non-stop capability, pipelines are preferable to supertankers. Unfortunately, there are large initial costs in building safe pipelines and relatively large recurrent costs in maintaining them. Many companies neglect pipeline maintenance, which contributes to pipeline accidents throughout the world.

Fugitive emissions were calculated based on Warren's theoretical count several years ago

Rather than providing an actual count of fugitive components onsite and using that to evaluate emissions, the Negative Declaration evaluated emissions based on a theoretical, years old estimate provided by Warren, and failed to provide the public with any measured data on fugitive component emissions onsite. The "gas analytical data" referred to was not provided, and was stated as being provided by Warren. No independent measurements by the AQMD inspectors of the facility's fugitive source emissions, leak rates, control efficiency, or repair rate were provided. "Screening values" were identified as the basis for Pressure Relief Devices (PRDs) without any further identification of the numbers used, basis, and reliability of this data. No measured data was provided on pressure relief device venting or leak rates. Regarding the methods used to evaluate fugitive, the Negative Declaration states in the appendix:

1 The Screening Value Range (SVR) Method was used according to the AQMD's "Guidelines for Fugitive Emissions Calculations" (June 2003). **This Method was chosen based on Warren's previous assessment in the 2006-2007 AER using the SVR Method and using gas analytical data from Warren.**

2 **The number of components are estimates obtained from Warren.** The distribution around 10k ppmv is based on **Warren's 2006-07 AER and the assumption that emissions from these new components should be similar to existing equipment.**

3 All SVR Factors (SVRFs) obtained from Table IV-2c for gas/light liquid in AQMD's "Guidelines for Fugitive Emissions Calculations" (June 2003).

4 Speciated emissions are based on THC Emissions and the gas analysis provided by Warren.

5 **The SVRF for "Others" was used for PRDs (based on 2006-2007 AER).**

(Neg. Dec., p. A-22 [emphasis added].)

The District clearly could have provided an updated count of fugitive components for the Warren facility, especially since the AQMD states that Warren is subject to District fugitives regulations. Fugitive emissions certainly have the potential to cause significant emissions, and the public is entitled to the details of the assessment done.

In addition, the calculations done were for VOCs only. **The Negative Declaration failed entirely to provide any estimation of H2S fugitive emissions.** Given the known impacts to neighbors (and the risk of fatal injury from H2S to industrial workers at the site) from these emissions, this is a major failing of the Negative Declaration.

In conclusion, there are significant impacts that were not evaluated for this Project and serious deficiencies in the Negative Declaration. Given the large potential for significant health and environmental impacts and the demonstrated impacts caused by this facility, it is urgent that you take action to fully evaluate these and protect the neighbors. You have more than enough facts and evidence in your possession to warrant the full EIR for this Project that the neighbors need and want. Thank you very much for your attention to this problem. The neighbors are counting on you.

Sincerely,

/s/

Maya Golden-Krasner, CBE Staff Attorney

/s/

Alicia Rivera, CBE Organizer

/s/

Julia May, CBE Senior Scientist