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Comment Received From: Jacqueline Ayer
Submitted On: 8/18/2025
Docket Number: 25-OPT-02

Attachments 8-13 to SORT Comment Letter

Additional submitted attachment is included below.

ATTACHMENT 8
CEA BESS QUALITY RISK REPORT: A SUMMARY OF THE MOST COMMON BATTERY ENERGY STORAGE SYSTEM MANUFACTURING DEFECTS.

CEA
Clean Energy Associates
INSIGHTS

BESS Quality Risks

A summary of the most common Battery Energy Storage System manufacturing defects

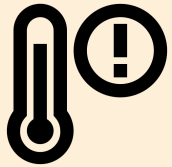
February 2024

The Past Several Years Have Shown That Thermal Runaway Poses a Significant Risk to the Energy Storage Industry

Data collected from CEA's factory quality inspections of BESS systems has found that these risks still exist:

26%

of inspected energy storage systems had quality issues related to the fire detection and suppression system.



18%

of inspected systems had quality issues related to the thermal management system.

The following report highlights the safety issues above as well as a host of other quality concerns.

CEA Has Conducted Factory Quality Audits On Over 30 GWh of Lithium-Ion Energy Storage Projects

- 320+ inspections in 52+ Battery Energy Storage System (BESS) factories
- 64% of tier 1* BESS cell manufacturers audited worldwide
- 1300+ total manufacturing issues identified

Locations of CEA factory audits

Here are our key findings...

*Tier 1: definition is based on BMI (Benchmark Mineral Intelligence)

Our Audit Process: CEA Assigns a Severity to Each Finding Depending On the Risk Level of the Issue

A **finding** is an issue identified during inspection that indicates deviation from standard best practices, processes or product specifications.

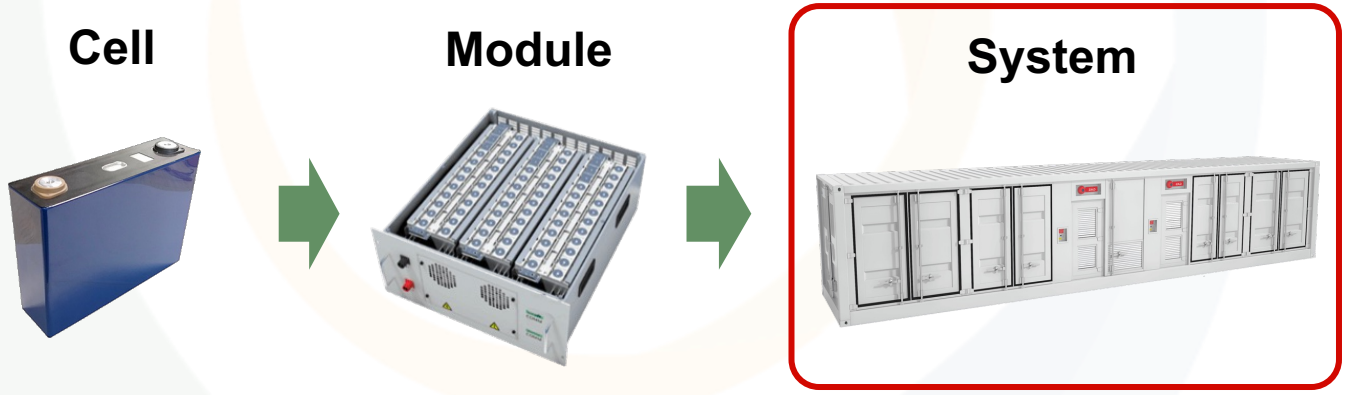
Finding Severity	Definition
Critical	Findings that may result in severe safety risks and hazardous conditions. Critical findings are likely to cause damage to other products or property, trigger non-compliance regulatory issues, and generally constitute a breach of mandatory regulations.
Major	Findings that may reduce the battery's functionality or impact safety in either short or long term.
Minor	Findings which do not pose a clear risk of production failure, but rather fall outside the quality requirements.

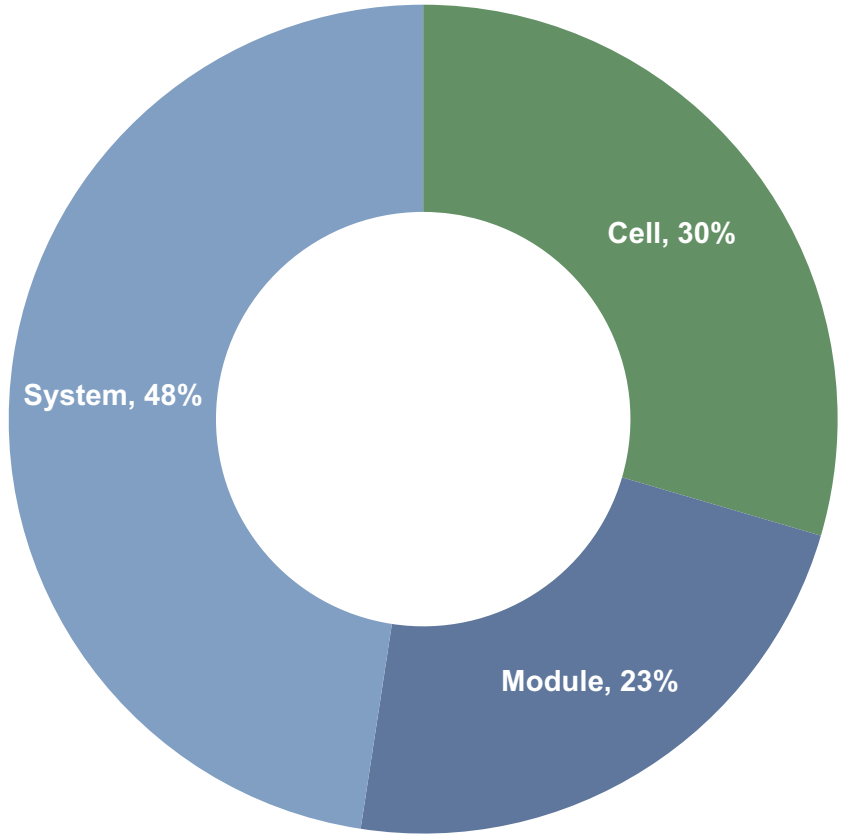
Distribution of Total Findings

With so much industry attention focused on cell selection, system integration should not be overlooked as a potential source of problems. **System-level defects accounted for nearly 50% of our QA findings.**

The large number of system-level issues is mainly caused by the following two contributors:

- The BESS integration process is highly manual and labor-intensive, with less stringent quality control procedures.
- Systems are very complex and are vulnerable to underlying problems originating from defects in upstream components that were not caught during earlier quality checks.

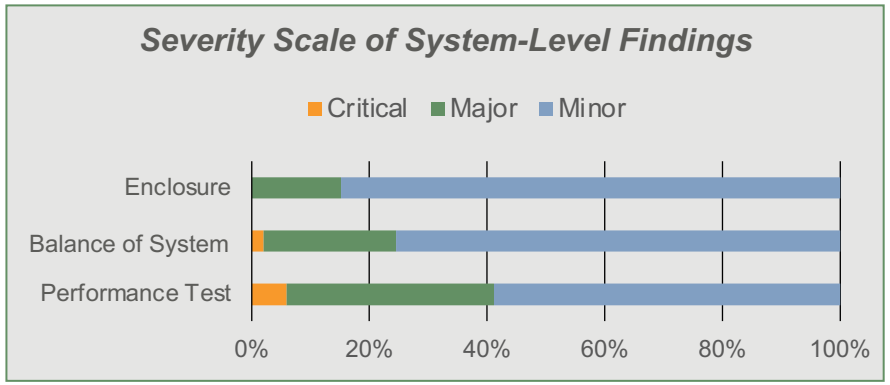




Distribution of all BESS Findings

Breakdown of System-level Findings

The majority of system-level findings occurred in the **Balance of System** and **enclosure**. **Performance test** findings usually indicate larger or more complex problems.



58% of system-level findings are Balance of System related

Why/How Does It Happen

Component defects and improper system integration procedures.

Example

- Liquid coolant leakage due to deformed flange plates, defective valves, loose pipe connections within the coolant circulation system
- Malfunctioning temperature, smoke, gas sensors, audible and visual alarms due to internal mis-wiring
- Live conductor exposed within the AC/DC distribution

34% of system-level findings are enclosure related

Why/How Does It Happen

Defects from enclosure manufacturing process and mishandling during transportation.

Example

- Poor strength and rigidity: lifting provision test, structural deformation, etc.
- Poor wiring and cabling arrangement
- Grounding mechanism defects
- Water ingress issue
- Appearance defects: painting specifications, markings, nameplate, openings, etc.

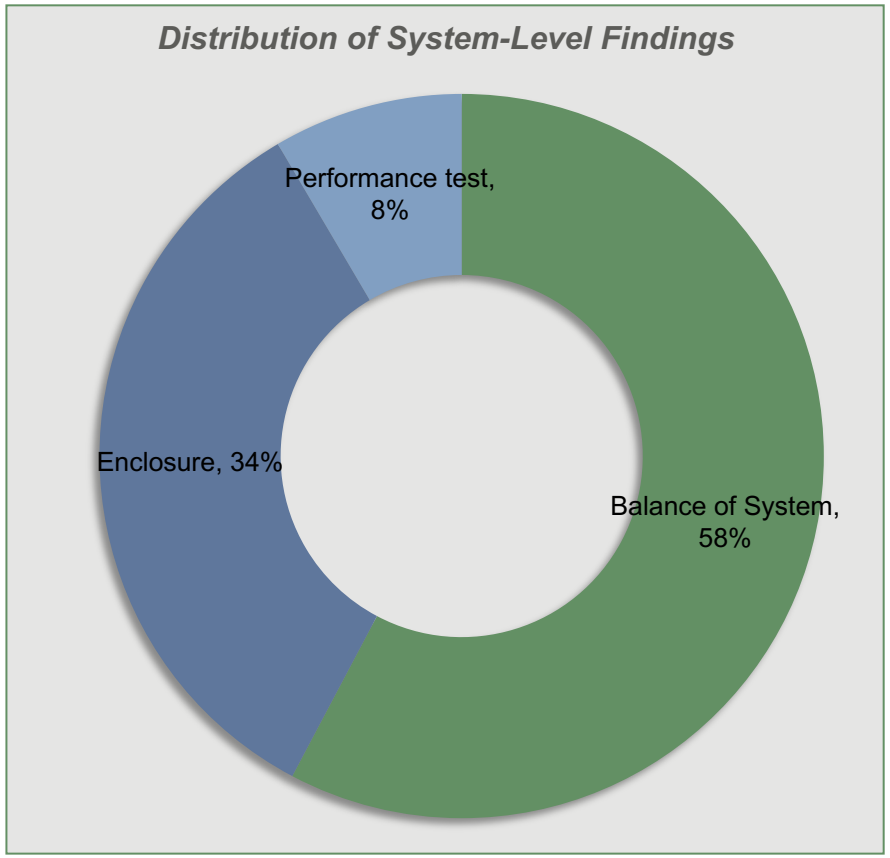
8% of system-level findings are performance test related

Why/How Does It Happen

A wide variety of manufacturing defects and/or improper system integration.

Example

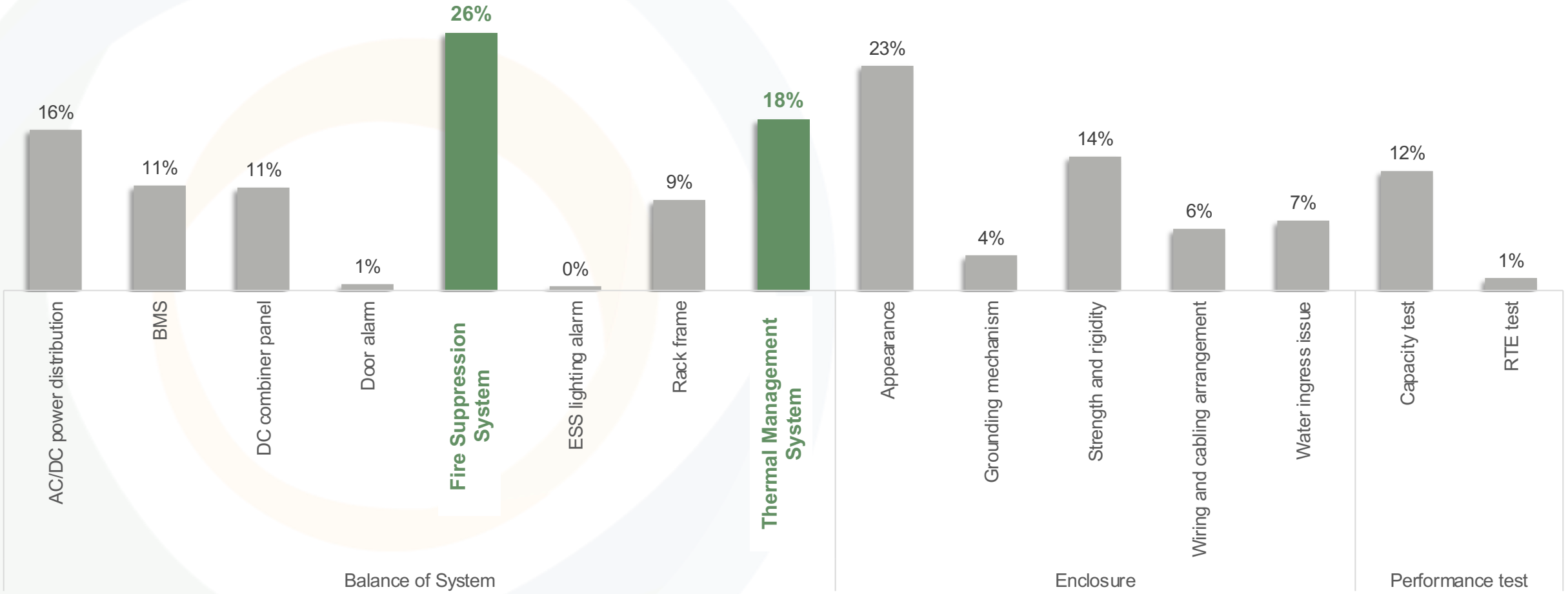
- Underachieving capacity and Round Trip Efficiency results from abnormally large temperature and voltage variations among battery cells within a module, due to high impedance from poorly welded wiring connections
- Charging/discharging failure due to wiring issues in battery rack's high voltage boxes



26% of BESS units that CEA inspected had defects in the **Fire Suppression System**, while **18% of units** had **Thermal Management System** defects.

*Fire suppression and thermal management systems are critical for functional safety, and defects in these systems can lead to **increased risk of fire**.*

Frequency of system-level BESS defects over total inspected units



Case Study – Common Fire Suppression System Findings

26% of inspected BESS units had fire suppression system defects

Non-responding release actuator for the fire extinguishing agent

Why/How Does It Happen

A diode within the actuator was faulty.

Risk

A malfunctioning actuator will not respond to the command of releasing a fire extinguishing agent, potentially allowing the fire to further propagate.

Example

Fire alarm abort button was not functional

Why/How Does It Happen

The fire alarm abort button was not responding to the user commands due to incorrect wiring.

Risk

The abort button allows user to deactivate an improperly triggered fire alarm; failure to deactivate can lead to unwanted fire extinguishing agent or sprinkler system activation which can cause serious damage to equipment.

Example

Non-responding smoke & temperature sensors

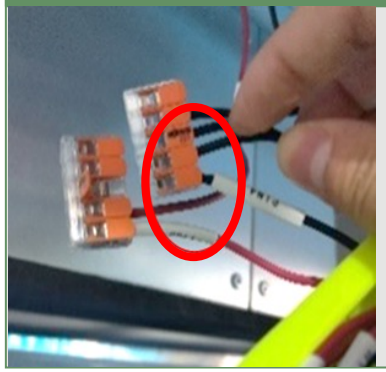
Why/How Does It Happen

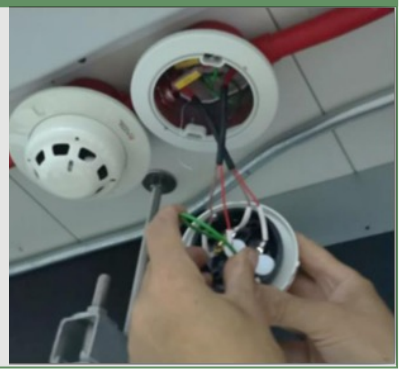
The smoke sensor was incorrectly wired, and a temperature sensor was reversely connected to power source.

Risk

An incorrectly wired smoke sensor cannot detect the presence of smoke within the system. A reversely connected temperature sensor can have a false reading. Malfunctioning of these sensors can pose a high fire and explosion risk.

Example





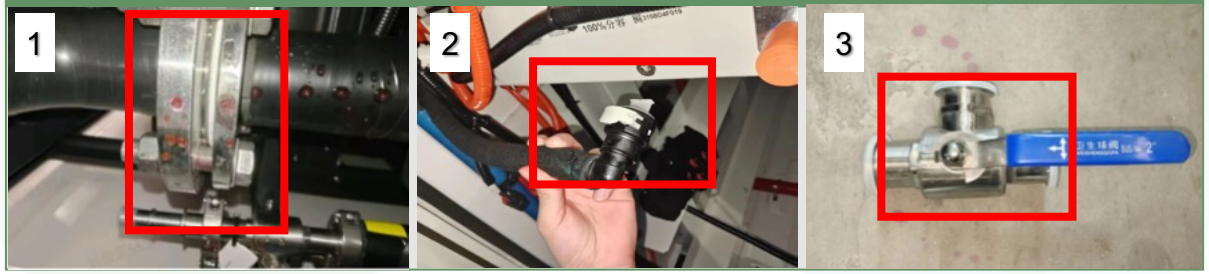
Case Study – Common Thermal Management System Findings

18% of inspected BESS units had thermal management system defects

Circulation System Components Failure

Why/How Does It Happen		
1. Flange plates are deformed from overtightening due to a loosely defined screw mounting Standard Operating Procedure (SOP).	2. Loose pipe connection: the fastener was not fastened from operator's mis-installation and not following SOP.	3. Defective incoming material: the valve comes with a loose stem.
Risk		
1. Internal short circuiting and thermal runaway initiation from continuous coolant leakage.	2. Severe short-circuiting events and thermal runaway initiation from potential massive coolant leakage.	3. Faster battery degradation from insufficient coolant flow control and internal short circuiting and thermal runaway initiation from continuous coolant leakage.

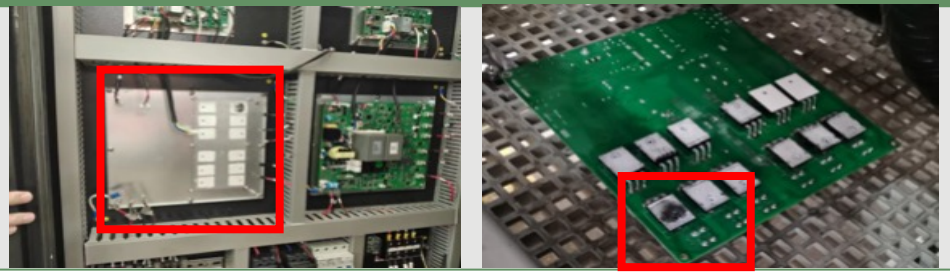
Example



Compressor mainboard short circuiting

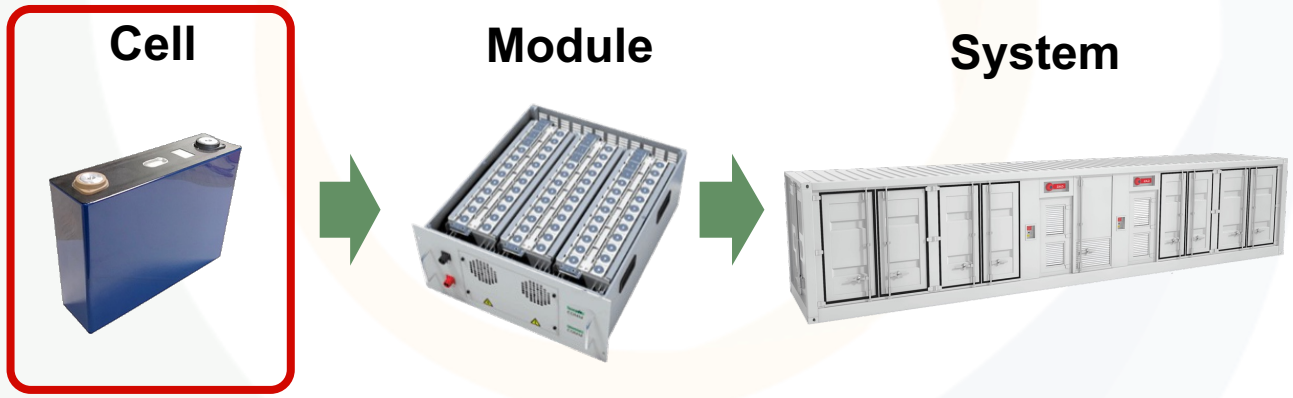
Why/How Does It Happen
Defective mainboard with a burned MOS (Metal Oxide Semiconductor) tube for compressor control.
Risk
1. Faster battery degradation from dysfunctional liquid cooling system. 2. Initiating thermal runaway or explosion with sparking from burned components.

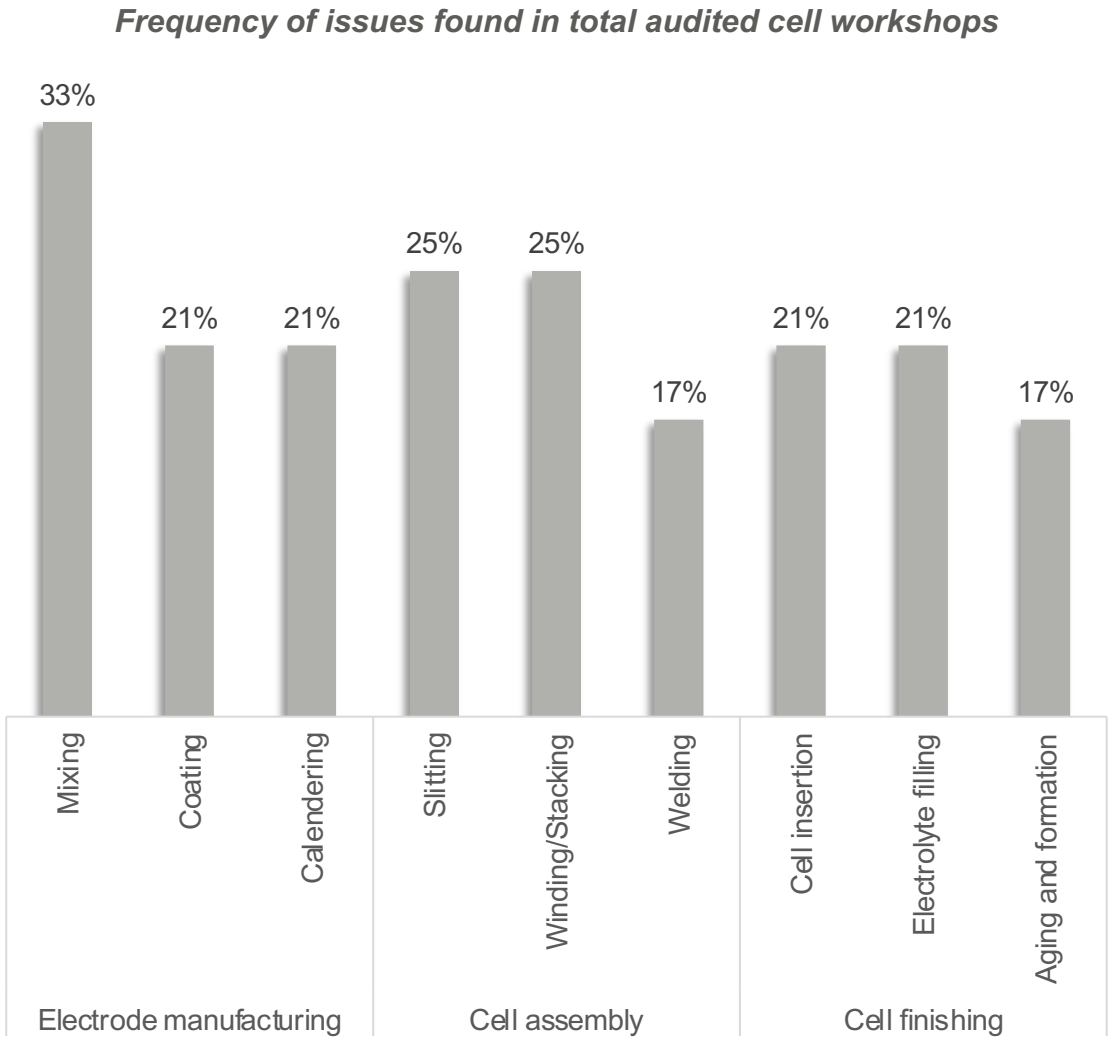
Example



30% of the Total Findings Occurred During Battery Cell Manufacturing

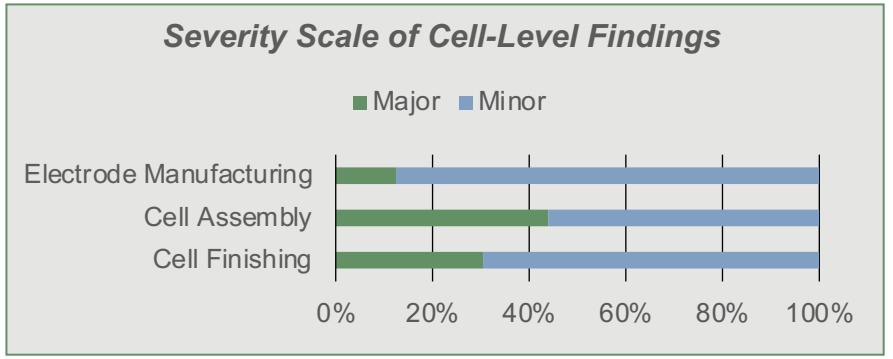
- Although battery cell factories have the highest level of automation, they make up a larger number of findings (compared to battery modules) due to their lengthy production processes and higher precision requirements, leading to more room for error.
- Audit findings on cells typically have a higher severity rating as cells are the building blocks of the energy storage system, and defects can be detrimental to system performance and safety.





Breakdown of Battery Cell Findings

Findings are evenly distributed due to strict precision and safety requirements throughout the entire cell manufacturing process.



32% of cell findings occur during electrode manufacturing

Why/How Does It Happen

Improper measurement system analysis and process control

Example

- Mixing: out-of-calibration viscosity meter, lack of expiration control record over the mixed active material
- Coating: missing key coating quality measurements such as surface density, coating thickness, and moisture content.
- Calendaring: deformed electrode sheets due to roller misalignment

38% of cell findings occur during cell assembly

Why/How Does It Happen

Improper process and quality control execution

Example

- Slitting: lack of burr size control, lack of monitoring on the cutter status and remaining life
- Stacking/winding: lack of inline electrode alignment inspection
- Welding: uncalibrated welding strength test that are conducted manually without well-defined pass/fail criteria

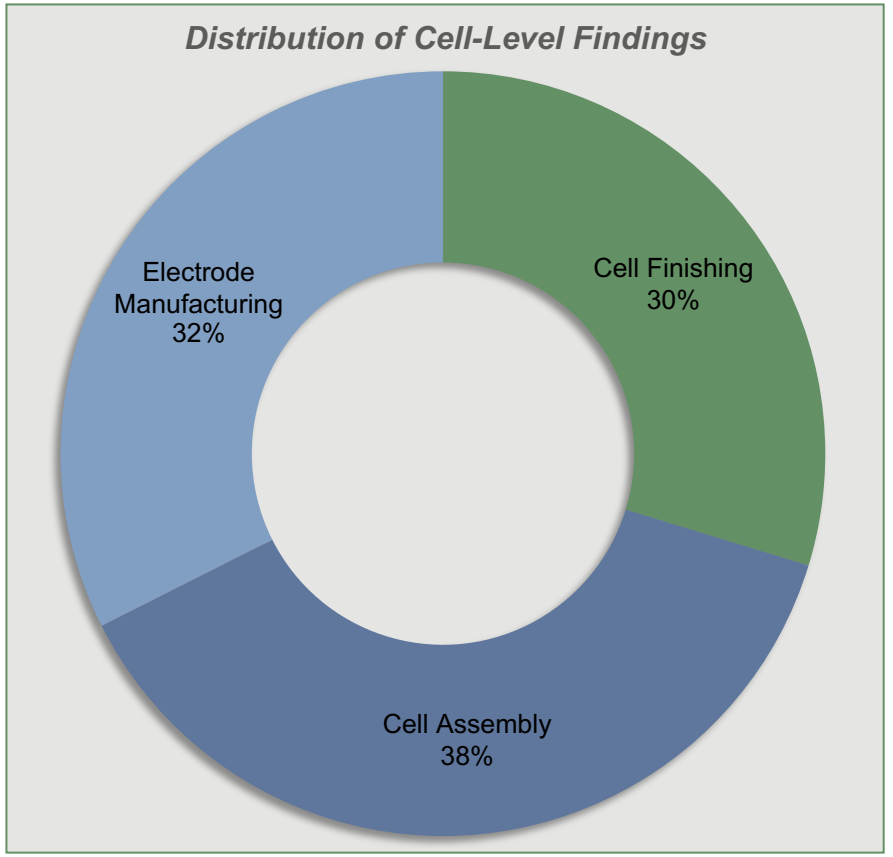
30% of cell findings occur during cell finishing

Why/How Does It Happen

Improper process and quality control execution

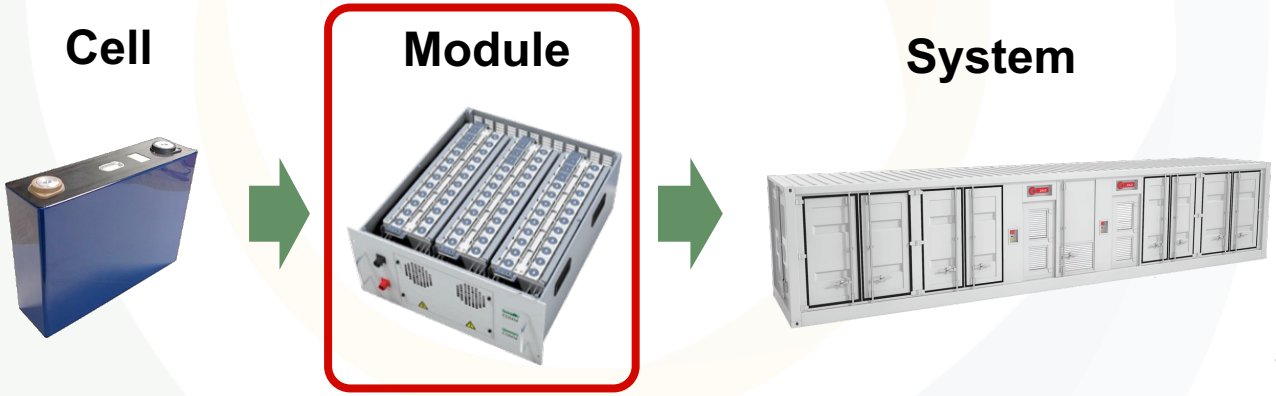
Example

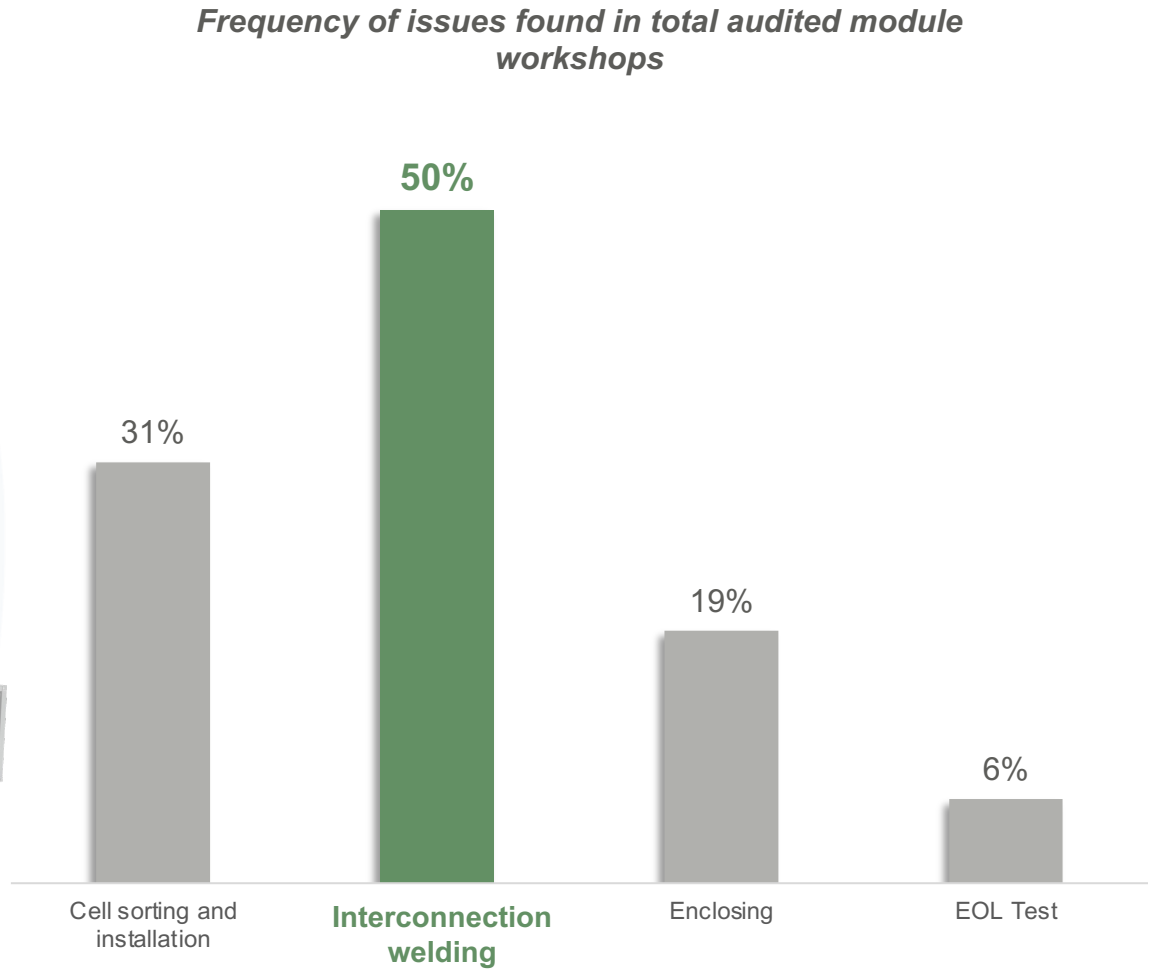
- Cell (jelly-roll/stack) insertion: lack of laser welding parameter verification, lack of inline alignment and clearance inspection after the aluminum cap is welded on
- Electrolyte filling: Loose control of environmental conditions (temperature and humidity), lack of sealing quality inspection which can lead to electrolyte leakage



23% of the Findings Occurred During Module Manufacturing, Largely Due to More Manual Production Lines

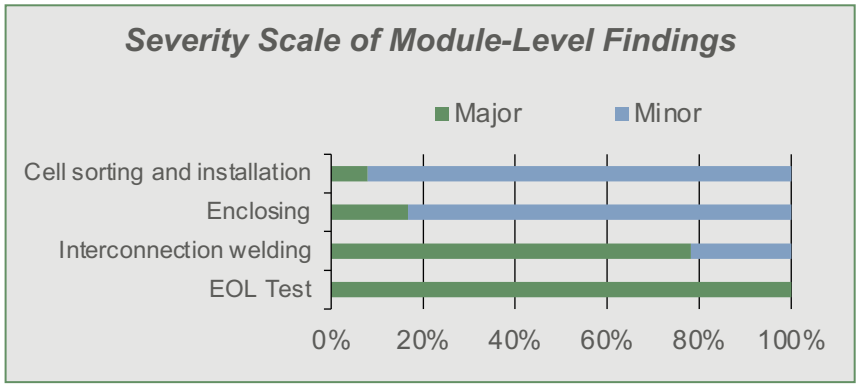
Module manufacturing issues often occur because lines are less automated, which creates room for imprecision in material handling and inferior welding quality.





Breakdown of Module-Level Findings

The automation level of module production varies among manufacturers. Welding quality issues and environmental control pitfalls can lead to end-of-line (EOL) test failures.



45% of module findings occur at cell sorting and installation

Why/How Does It Happen	Example
Manufacturing inconsistency due to manual operation and improper quality control protocols	• Lack of error-proofing measures to ensure cells are assembled with the right orientation • Inconsistent glue usage and position • Unqualified BOM (Bill of Materials) change on insulation layers within the module.

41% of module findings occur during interconnection welding

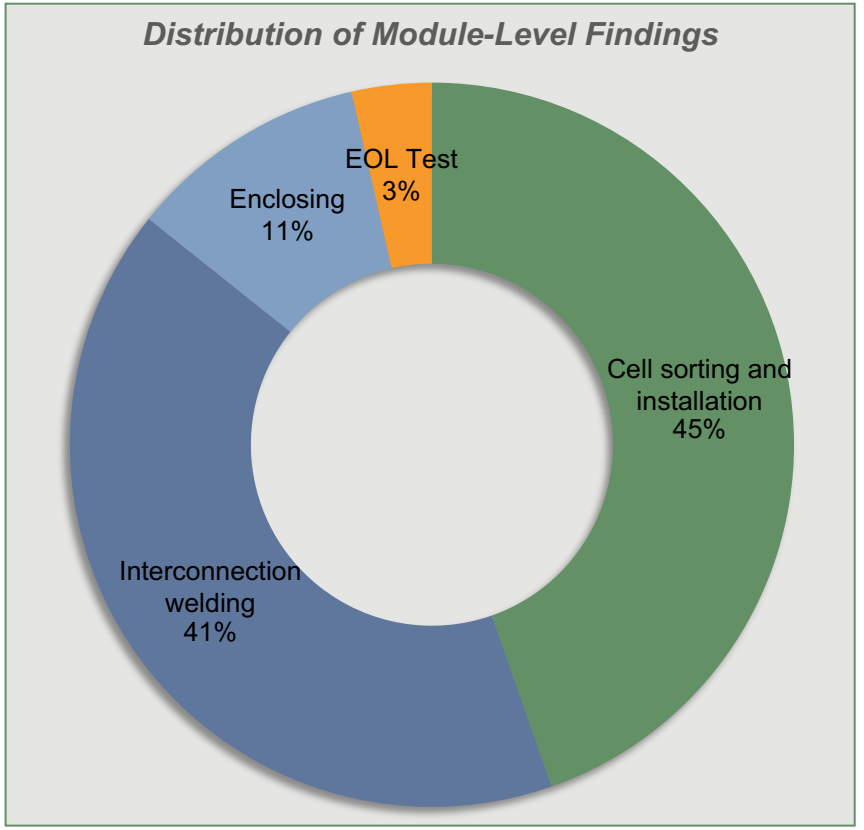
Why/How Does It Happen	Example
Lack of efficient quality control procedures and mis-operation risks due to a highly manual process	• Mislocated welding position • Non-calibrated welding strength test • Lack of procedure of cleaning up welding slags.

11% of module findings occur during enclosing

Why/How Does It Happen	Example
Lack of efficient quality control procedures and mis-operation risks due to a highly manual process	• Inconsistent cell group placement • Mechanical damages to fixtures and cooling plates.

3% of module findings occur during EOL testing

Why/How Does It Happen	Example
Cell manufacturing inconsistency and mis-wiring from highly manual processes	• Failed dielectric withstand voltage test due to poor internal wiring insulation and wiring arrangement • Abnormal cell voltage difference due to defective cells.



What Can You Do To Ensure the Long-term Financial Health of Your BESS Assets?

Golden FAT

- **Closing the Gaps**: We review your procurement contract, project requirements, and FAT checklist to ensure your energy system is safe and performs well, preventing any surprises.
- **Early Detection**: We identify risks in the supplier's checklists early to save costs and extend your system's operational life.
- **Expert Check-Up**: Our experts verify adherence to key safety and performance standards for a reliable energy system.
- **Negotiation Support**: We support you in negotiating and adjusting the FAT checklist deviations.

Factory QA

- **Factory Audit (FA):** Engineers check factories with a 300+ point checklist, assess risks, and recommend fixes.
- **Inline Production Monitoring (IPM)**: Engineers monitor production in real-time, ensure quality, spot issues, and suggest corrections.
- **Pre-Shipment Inspection (PSI):** Engineers inspect and test a random sample of finished products, record findings, and advise on improvements.
- **Factory Acceptance Test (FAT):** Engineers inspect and test finished products for performance and suggest corrective actions.

CEA
CLEAN ENERGY ASSOCIATES
INSIGHTS

For more information

info@cea3.com / https://www.cea3.com

ATTACHMENT 9
SANTA CLARITA VALLEY, ANTELOPE VALLEY AND SURROUNDING AREAS DISCLOSURE AND ADVISORY FROM THE SOUTHLAND REGIONAL ASSOCIATION OF REALTORS®.

SOUTHLAND REGIONAL **ASSOCIATION OF REALTORS®**

Santa Clarita Valley, Antelope Valley and Surrounding Areas Disclosure and Advisory

Property _____ ***"Subject Property"***

Seller and Buyer understand and agree that this Local Area Disclosures statement is not a complete list of all matters concerning Property, or residing in, the Santa Clarita Valley, Antelope Valley and the surrounding unincorporated communities, or matters that are otherwise significant. Also, the entity, phone numbers, and/or websites that are included may not be the only source of information. Buyer is strongly encouraged to conduct a careful, thorough, independent, and complete investigation of all matters relating to the decision to purchase Property and all other matters that Buyer deems appropriate to make an informed and voluntary decision, including, but not limited to, consulting with appropriate specialists, experts, or other professionals.

For Completion by the Seller

Answer the questions below.

1. **Solar**

Does the property have a solar panel or power system? ☐ Yes ☐ No

If yes, is the unit ☐ Leased ☐ Owned without financing ☐ Owned with financing ☐ Power Purchase Agreement

Company _____ Phone _____

a. Do you have copies of Solar Documents and Agreements? ☐ Yes ☐ No

b. Do you have a PACE, HERO or SCEIP Loan? ☐ Yes ☐ No

c. Seller to provide copies of any and all Solar Documentation and Agreements in their possession to Buyer.

d. Buyer may or may not be able to qualify for existing payments and/or assuming a current loan of a solar purchase.

2. **Common Mailbox**

Is the mailbox located in a common cluster mailbox? ☐ Yes ☐ No If Yes, what is the mailbox number? _____

Location of Mailbox _____

Disclosures for All Areas

1. **BESS- Battery Energy Storage Systems:** There are multiple and various projects associated with lithium batteries and large-scale storage systems throughout the State of California, including in Santa Clarita near Sierra Highway and Soledad Canyon called the Terra-Gen project. Buyer is advised to investigate this matter during Buyer's investigation of Property contingency with appropriate professionals and governmental entities as to current facilities, and systems as well as any future facilities and systems that may be implemented in the area.

2. **Cell Phone Towers:** Buyer is aware that cell phone towers may be in close proximity to the subject property, and new towers or changes to existing towers may occur at any time. Buyer is advised to investigate the existence of cell phone towers in the area, and any planned or proposed changes to or additions of cell towers in the future.

3. **Compliance with Home Hardening and Defensible Space Requirements:** Residential 1–4-unit properties located in either high or very high severity fire zones are required to be in compliance with various State laws, local laws, where applicable, related to Home Hardening and Defensible Space. Buyer has been informed and acknowledges that there may be cost factors associated with bringing the Property into compliance with these laws after the close of escrow. Buyer is advised to investigate this matter during Buyer's investigation of Property contingency period. Brokers do not have expertise in this area, and Buyer is advised to consult with their own professionals with regard to these requirements and the potential costs factors associated with this.

4. **Construction Defect Litigation:** Some builders and developers have been the subject of class action and/or construction defect lawsuits. Seller and Buyer are advised to make their own investigation as to whether the Property, the Seller's interest in the Property, and/or the interest of a prior owner of the Property have been the subject of any such litigation. If so, the Seller and Buyer are advised to make their own investigation as to whether any defective condition to the Property, whether or not disclosed in the Transfer Disclosure Statement or other disclosures, is subject of such litigation. Except as may be otherwise stated in the Transfer Disclosure Statement or other disclosures, Broker has made no independent investigation regarding this matter.

5. **County, Juvenile and State Prison Facilities District (Correctional Facilities):** Buyer is aware that there are Correctional facilities located throughout Southern California. The state and county prisons may house inmates (both male and female) classified as minimum, high-medium, and maximum custody inmates. These facilities include, but are not limited to:

- California State Prison - Los Angeles County and the Mira Loma Detention Center are situated on the west side of the City of Lancaster between 50th and 60th Street West and Avenues J and I. There is also the California City Correctional Facility located at 22844 Virginia Blvd.
- The Los Angeles jail facility "Pitchess Detention Center is situated on the east side of the I-5 freeway near Castaic.
- Juvenile jail facilities: Buyer is aware that juvenile jail facilities "Camp Munz" and "Camp Mendenhall" are situated in the southwest corner of the Antelope Valley in Lake Hughes and that the Challenger Memorial Youth Center is located at 5300 West Avenue I in Lancaster, and Camp Joseph Scot and Camp Kenyon Scudder is located at 28700 Bouquet Canyon Road in Saugus.

These facilities may be expanded from time to time to meet the needs of the State and County prisons. Buyer is advised to investigate the impact of these facilities, if any, on the decision to purchase. For more information go to www.lasd.org and www.cdcr.ca.gov, probation.lacounty.gov.

6. **Electrical Outages:** Buyer is aware that due to the water shortage, climate change and the plethora of fires in California, intermittent electrical outages are a potential for all areas of the State. The electric utility company servicing the area in which the Property is located, may have to make decisions to have periodic electricity outages which may impact the Property. Buyer is advised to investigate this matter during Buyer's investigation contingency. Broker does not have expertise in this area and cannot give Buyer any guidance on this issue. Buyer is advised to consult their local provider regarding this matter.

7. **Flooring Disclosure**: Neither Seller nor Broker makes any representation or guarantee as to the type or condition of the flooring located underneath existing carpeting or other floor covering, except as may be noted in writing by Seller. Buyer is advised to conduct their own independent investigation of the flooring during Buyer's physical inspection period, if this is an important factor to Buyer. Buyer understands any investigation of the flooring must be done in a manner that will not damage the existing floor covering. Seller is required to disclose any adverse conditions regarding flooring underneath the existing floor covering that are known to Seller; however, Buyer understands that Seller is NOT responsible for damaged flooring underneath existing floor covering unless Seller was aware of such condition and failed to disclose this to Buyer. If Buyer is informed "hardwood" or "wood" floors exist at Subject Property, Buyer understands this is NOT a representation or guarantee that all flooring is wood or hardwood and is not a representation or guarantee as to the condition of said flooring.

8. **Flooring in Condominium and Common Interest Complexes:** Many Condominium Complexes or Common Interest Developments have restrictions on owners of upper floor units replacing carpeting with wood or other hard surfaces. This restriction is due to the fact that hard flooring surfaces on upper units can cause an increase in noise to owners of units located below such upper floor units. Buyer is advised to investigate this matter before making any changes to flooring in upper-level units in Condominiums and other Common Interest properties with upper and lower floors owned by different owners.

9. **Future Development, Land Use, and Neighborhood Conditions:** The Santa Clarita Valley, Antelope Valley, Acton and Agua Dulce and the surrounding unincorporated communities, is a region still undergoing significant real property development. The impact of growth and development may alter or affect Buyer's anticipated use and enjoyment of the Subject Property. Contact local town councils and local agencies, including but not limited to local Planning Departments for more information on projects.

Although a so-called "Master Plan" and/or "Specific Plans" may exist, it is neither fully approved nor does it describe all areas of the valleys or surrounding areas. Tracts of unimproved land are in various stages of planning and/or approval for the construction of residential, commercial and industrial buildings. Buyer is advised that ultimate use of land adjoining or even remote from the Subject Property is, or may be, the subject of proposed, planned or approved, but as yet not started, development. Such development may result in neighborhood, community and regional changes including, but not limited to: changing the proximity of hospitals and fire protection services, may impair existing or anticipated views, may affect neighborhood traffic and noise by the opening of cul-de-sac streets into previously undeveloped land or other nearby streets, the widening of existing streets, the building of entirely new roads, streets or freeways and the construction of appropriately zoned structures near to, or otherwise affecting, the Subject Property. Vacant lots that may be adjacent to a property may be improved and could affect Subject Property and any views. Buyer is further advised to investigate all such matters with appropriate government agencies. Buyer is advised to investigate the known and/or prospective implementation of development plans and projects and the effects, if any, on the value, use, enjoyment of the Subject Property in conjunction with Buyer's investigation of the Property.

10. **Gas Shut-Off Valve Availability**: Buyer is advised Earthquake Shutoff Valves are available, but not required in certain areas. Buyer is advised to investigate the operation, installation, cost and protection this valve may offer in an earthquake.

11. **High-Speed Rail Proposal**: Buyer is informed the State of California is considering the route of a high-speed rail line between Northern and Southern California. Buyer and Seller are advised that the California High-Speed Rail Authority has indicated that a route for a High-Speed Train will include running through the Antelope and Santa Clarita Valleys, and further north and south beyond these areas. The State of California is currently contemplating numerous routes for said rail line. During the construction period there will be numerous items impacting surrounding neighborhoods including changes in traffic patterns, heavy machinery, construction noise, dust and other construction related issues, train operations and possible eminent domain issues will be expected. Real Estate Brokers cannot give any opinion on when this high-speed rail will be constructed nor where the high-speed rail will ultimately be constructed. While it is likely property values in the areas surrounding this project will be impacted, Real Estate Brokers are not in a position to determine what impact this project would have on any particular property.

Buyer is advised to satisfy any and all concerns directly with any questions concerning this proposed construction by contacting the California High-Speed Rail Authority at (916) 324-1541 or visit www.hsr.ca.gov, or by email at info@hsr.ca.gov. The local Southern California office can be reached by email at southern.California@hsr.ca.gov.

12. **High Winds:** Buyer is informed that the Santa Clarita Valley, Antelope Valley, Acton and Agua Dulce and the surrounding unincorporated communities experience high winds from time to time. High winds can result in blowing dust, sand, debris and other airborne particulates. Winds can damage, including but not limited to, roofing shingles and tiles and cause trees to fall. During high winds, power companies may elect to shut down power to homes due to fire risks in any given area at any time of day or night and power may be off for multiple days. Buyer is advised to conduct Buyer's own independent investigation of this matter during Buyer's investigation time period for the Property.

13. **Homeowner's Associations (HOA) Complexes Litigation and Insurance Issues:** There has been an ongoing insurance crisis in California and this has affected and can affect complexes governed by an HOA whereby HOA's can be greatly underinsured and due to rising costs of insurance can lead to assessments and/or HOA dues increase or a combination of both. Buyer is advised to check into all aspects of an HOA, including but not limited to all financials, insurance issues, repair projects now and in the future, reserve studies, litigation, assessments, and dues increases. Litigation and/or insurance issues, as well as financial documents such as but not limited to reserve studies can result in lenders not being able to loan on the properties or being able to lend but at more down payment requirements and higher interest rates.

14**. Horse/Livestock Zoning:** Buyer is advised the mere presence of horses or other livestock or animals on or near adjacent properties does not necessarily mean that the Subject Property is zoned for horses or other livestock or animal boarding. Buyer is advised to conduct a thorough investigation with appropriate entities, such as the County of Los Angeles. For more information, search at planning.lacounty.gov/.

15. **Landfills**: The Santa Clarita Valley, Antelope Valley and the surrounding unincorporated communities are in close proximity to current landfill sites and/or the possibility of other landfill sites unknown to Seller or Broker(s). Landfills in the area may continue to expand and increase their land use, as well as increase the types (hazardous waste, non-hazardous) and tonnage of waste deposited into the landfill on a daily and weekly basis. Current Landfills include, but are not limited to, Sunshine Landfill off San Fernando Road in Sylmar, Chiquita Canyon Landfill located in LA County off Highway 126 on Henry Mayo Drive adjacent to Val Verde and near Castaic, Antelope Valley are the Antelope Valley Public Landfill I at 1200 West City Ranch Road, Palmdale, the Lancaster Landfill and Recycling Center at 600 East Avenue F, Lancaster, and the Kern County Landfill at 400 Silver Queen Road in Mojave. Buyer shall make Buyer's own investigation of the effect, if any, on the value and the Buyer's use and enjoyment of the Property resulting from the Property's proximity to landfill sites. Buyer should also be informed of the rise in illegal dumping on private property (California Penal Code 374.3). To report illegal dumping, call (888) 838-6746 or visit www.CleanLA.com. Additionally, there may be class action lawsuits and/or lawsuits that may be filed at any point in time relating to effects of landfills in a community, including but not limited to noxious odors, health concerns and more.

Chiquita Canyon Landfill has had issues with odors emanating from the landfill, resulting in various lawsuits being filed by various lawyers, as well as a class action lawsuit, over noxious odors and health concerns. There has been a good deal of media attention surrounding the issues. Various meetings have taken place and various agencies are involved, including but not limited to Supervisor Kathryn Barger's office for LA County, the EPA, Southcoast Air Quality management. **As of January 1, 2025, Chiquita Canyon has chosen to close its active waste disposal operations and not accept solid waste but clean-up efforts may continue at the location. It is unknown at this time future effects of this closure, including but not limited to rate increases for trash services.** For more information, Buyers may go online including but not limited to the following: https://www.chiquitacanyon.com www.somlawyers.com, https://kathrynbarger.lacounty.gov/, , www.aqmd.com, www.epa.gov

Sunshine Landfill has also been the subject of various law firms claiming issues with the landfill. For more information, Buyers may go online at https://www.aqmd.gov/home/research/pubs-docs-reports/newsletters/jan-feb-2024/landfill-updates.

16. **Landscape Maintenance Districts:** All areas may have a landscape maintenance district. A "landscape maintenance district (LMD) is a special district established within a city of municipality where property owners within a designated area contribute funds through a special assessment to pay for the ongoing maintenance and improvement of public landscaping within that district, providing benefits specifically to those properties located within its boundaries; essentially, it allows for enhanced landscaping beyond what is typically provided by the city at large, funded by the property owners who directly benefit from it. The amount of the assessments and the services performed within the district are subject to changes and may increase and maintenance or services may be shifted to individual homeowners. Buyer is advised to check all aspects relating to property taxes, landscape maintenance districts, assessments and services for Subject Property including but not limited to contacting the local government's Public Works department which oversees collection of special assessments from property owners within a district.

17. **Licensed and Community Care Facilities:** Buyer is advised licensed care facilities may be found in any neighborhood and are protected by State law. Buyer shall conduct their own investigation of such matters and will not rely on Brokers or Agents for information regarding the nature and location of these facilities.

18. **Mail Delivery:** Buyer is advised to ask Seller and to check with local agencies as to local mail delivery guidelines, as many areas may not have mail delivered to the properties, depending upon the location of the Subject Property.

19. **Mello-Roos, Community Facilities District Taxs and Bonds:** Many areas have Mello-Roos Taxes, Community Facilities District Taxes (CFD) and/or Bonds. A CFD is a special tax district created by state law to finance public improvements and services in a specific area. CFD's are also known as Mello-Roos Districts. Buyer should be aware they may be subject to change in amounts and duration and Buyer should not rely on these types of taxes or bonds ending and should check with appropriate entities and administrators regarding these taxes and bonds as to amounts and duration. Natural Hazard Reports that Buyers receive through escrow are sources to show Mello-Roos, Bonds and taxes and administrator contact information.

20. **Metrolink and/or Other Railway Service**: Buyer is advised the Subject Property may be situated in or near one of the service areas of Metrolink and/or other railway service. Train services operate 24 hours a day. There may be nuisances including, but not limited to, noise or vibration, possible traffic delays due to train traffic, traffic to and from rail stations, and other possible nuisances.

21. **Multiple Parcels, Property Tax Bills and NHD Disclosure**: Subject property may have multiple parcels and multiple property tax bills separate for each parcel. Buyers are responsible for making sure at tax time that all parcels are covered and paid for or there may be future legal and monetary issues and liabilities, including but not limited to fines, liens and loss of parcel(s) at Tax Sale. If Buyers choose to impound their property taxes with their lender, Buyers should receive Information Only bills and it is Buyers sole responsibility to make sure their property taxes are being paid by lender and/or Buyers on ALL parcels associated with Subject Property.

Further, Seller(s) are required to provide Buyer(s) with Natural Hazard Disclosure Report that covers all parcels; i.e. multiple reports or report with Addendum covering all parcels. For more information about property taxes, go to www.lacountypropertytax.com.

22. **National Forest Lands:** Buyer is advised the Santa Clarita Valley, Antelope Valley and the surrounding unincorporated communities are near and, in some locations, adjoins the Angeles National Forest or Los Padres National Forest. Said National Forest is a natural wildlife habitat and is also used for a variety of recreational purposes.

23. **Oak Tree Ordinance:** The Santa Clarita Valley, Antelope Valley and the surrounding unincorporated communities have ordinances regarding oak trees, including, but not limited to, use, maintenance, trimming, cutting, removal, and pruning of any oak tree. There are permit guidelines as part of the ordinance. Buyer is advised any oak trees on or near the property may interfere with modifications or additions to property and may interfere with the use, expansion, and enjoyment of the Subject Property. Buyer is advised to consult appropriate professionals and agencies regarding any oak trees near or on the Subject Property.

24. **PACE/HERO Improvements:** Los Angeles County has implemented a program that assists homeowners to install energy efficient, renewable energy and water saving improvements to their properties. The program is known as the Los Angeles County Residential Property Assessed Clean Energy Program ("PACE"). Payment for the home improvements is financed annually by an assessment on the homeowner's property which shows on the owner's real property tax bill. The assessment is a lien on the property just as real property taxes are a lien. When the property is sold or otherwise transferred, the assessments continue as a property lien. This lien is similar to a property tax lien in that it has "super priority," which means it is senior to all private liens including deeds of trust and mortgages. Payment of the assessment liens is due at the same time as property taxes are due.

25. **Post Burn Issues/Mudflow:** Many areas in Southern California periodically suffer damage due to brush fires and firestorms that ravage an area. Rains can pose a threat of additional damage due to flooding, mud and debris flows. Buyers should consult local and county agencies, such as Department of Public Works www.dpw.lacounty.gov//wrd/fire, and the City of Santa Clarita Website http://readyforrain.santa-clarita.com/. Buyer is advised to consult insurance professionals regarding availability of insurance coverage and all options for subject property.

26. **Private Waste Disposal Systems:** This disclosure is in addition to the Statewide Buyer and Seller Advisory: Buyer and Seller are aware that the Property may be serviced by a private waste disposal system (the "System") consisting of a septic tank, cesspool, seepage pits, distribution box, leach field/trenches, leach lines or a combination of such mechanisms. No representation or warranty is made by Seller or Broker concerning the condition, operability, size or capacity of the System, nor whether the System is adequate for use by the intended occupants of the Property. Buyer is aware that a change in the number of occupants or in the quantity, composition or methods of depositing waste may affect the efficiency of the System. In addition, the amount of rainfall may also affect the efficiency of the System.

Therefore, Buyer should obtain an independent evaluation of the System by a qualified sanitation professional as a part of Buyer's inspection/contingency period. Buyer should verify with the Septic Inspector if septic report includes the tank only, or other additional components of the septic system such as pit(s), and leach field(s), leach trenches, etc. In some cases, Buyer's lender may require a System inspection. Other System related costs may arise, including but not limited to, locating, pumping or providing outlets to the ground level. **BUYER AND SELLER ARE AWARE THAT ALL OF THESE COSTS ARE NEGOTIABLE BETWEEN BUYER AND SELLER.**

Broker is unable to advise Buyer or Seller regarding System-related issues or associated costs, which may be significant. Many factors, including but not limited to natural forces, age, deterioration of materials and the load imposed on the System can cause the System to fail at any time. In the event an existing septic system fails in the future, the System may be required to be upgraded to current health department standards. This could result in additional permits, geological/soils reports, design, and installation costs as well as the possibility of requirements to hook into a public sewer if available.

27. **Propane Gas:** Buyer is aware many properties are or may be served by Propane Gas delivered by a company into tanks that are usually rented. Buyer is advised that gas appliances like, but not limited to, clothes dryers, ranges, water heaters, barbeques originally designed and built for operation with natural gas may have to be modified to operate with Propane Gas. Not all appliances may be equipped to operate with Propane Gas nor be able to be modified and Buyers should consult appropriate professionals regarding appliances and propane gas. Sellers are responsible for any outstanding balances on propane accounts and shall be paid in full prior to closing. Any propane in the tank will be considered part of the sale. Unless otherwise written and agreed to, Seller shall provide sufficient propane for inspections and final walk thru prior to closing. Seller shall turn over any paperwork or information regarding the propane tank and Buyer is advised to contact the company, within their contingency time frame, regarding transferability and is advised to transfer propane along with any other utilities into their name prior to possession of Subject Property.

28. **Proximity to Dam(s)/Lakes:** The Santa Clarita Valley, Antelope Valley and the surrounding unincorporated communities are in close proximity to existing dams and lakes including, but not limited to, Castaic Lake, Pyramid Lake, Elizabeth Lake, Lake Hughes and Bouquet Reservoir, Lake Palmdale, and Fairmount Reservoir. Buyer should investigate the proximity of the Subject Property to any such facilities and any potential effects they may have on the Subject Property.

29. **Proximity to Electrical Power Lines**: There are high-voltage electrical lines that can, in some cases, run adjacent to rural and/or residential properties. There can be, including, but not limited to, additional switching stations added, updating of power lines and towers, increasing sizes and/or conductors, etc. One such project is called "Barren Ridge" and more information regarding this project can be obtained by calling 877-440-3592 or on line at www.ladwp.com/barrenridge.

30. **Rent Control/Just Cause Eviction and Tenant Protection Bills:** The State of California and Local Cities and Counties have enacted several bills into law regarding rent control, just cause eviction and other tenant protections. Buyer is advised to conduct their own independent investigation, and to contact their own independent legal counsel, to determine if these laws or others apply to their individual circumstance and/or if they may be exempt. Brokers and Agents are not qualified to advise Sellers or Buyers regarding these matters.

31. **Rental/Leased Equipment:** The Property may be equipped with certain rental/leased equipment, such as but not limited to, alarm system, home automation/smart home devices, solar systems or water softening device. Buyer shall investigate with Seller whether Seller owns the equipment, the systems or rents the same. If not owned by Seller, the systems may not be transferred to Buyer without Buyer entering into a separate rental agreement with the rental company involved. Buyer is advised that the cost to assume a rented or leased item may affect their loan qualification.

32. **Review of Preliminary Title Report and Easements:** Buyer is advised to read and review all documents that may impact the title, use or possession of the Subject Property, and to have a physical inspection of the Subject Property for possible easements or encroachments, including without limitations roads, paths, structures, utility devices and other improvements. The Broker(s) have not verified, and are not qualified to verify, whether recorded or unrecorded documents or easements or encroachments affect the title, use or possession of the Subject Property. Buyer is strongly urged to employ appropriate competent professional(s) such as civil engineer(s), surveyor(s) and general contractor(s) to review all issues that may impact title, use or possession of the Subject Property. Buyer may also contact the title company to discuss title and the title policy being issued for the Subject Property and about the availability, coverage and cost of other title policies and/or endorsements that may provide a higher degree of coverage for Subject Property. Buyer is advised they may request from the title company color-coded easement maps with regard to the Subject property and various easements, as well as request a hyperlinked Preliminary Title Report and all recorded documents found on the prelim to review and investigate during their inspection contingency timeframe per contract.

33. **Road Maintenance:** Various properties may be on dirt roads, private roads and may or may not have road maintenance agreements in writing as to who maintains the road(s) and cost of maintenance. Buyer is advised to review the preliminary title report for any recorded document that may be recorded relating to road maintenance and inquire of Seller who maintains road(s) and costs involved in road maintenance and to seek independent legal advice regarding any agreements or lack thereof.

34. **Sediment Placement Sites (SPS):** Buyer is advised the Subject Property may be in the vicinity of a current or future Sediment Placement Site (SPS). The Los Angeles County Flood Control District has established these sites to place the sediment being removed from debris basins throughout Los Angeles County. These sites are designed for putting soil and rock only and not for dumping garbage or any other materials. Currently there are approximately 20 active SPSs throughout Los Angeles County with seven located within or near the boundaries of the San Fernando and Santa Clarita Valley, with additional sites proposed for the future. Such SPS sites currently exist in Sylmar (May Canyon), Chatsworth (Brown), Santa Clarita (Wildwood), Toluca Lake (Aqua Vista), and Sunland/Tujunga (Zachau, La Tuna, Blue Gum). A map of these SPS sites may be found at https://dpw.lacounty.gov/wrd/sediment/maps/index.cfm. Buyer agrees to make their own investigation of these sites, and their effects, if any, on the value, use, and enjoyment of the Subject Property.

35. **Sewage/Waste Disposal System:** Buyer shall conduct Buyer's own independent investigation as to the type and adequacy of the sewage/waste disposal system for the Subject Property. Broker makes no representation as to the existence and/or condition of the sewage/waste disposal system. Seller and Buyer should further note that the existence of a Sewer Permit does not guarantee that a property is connected to a Sewer.

36. **Unmanned Aircraft Systems (UAS) Drones:** Buyer is aware that the use of drones may be limited due to airspace restrictions in the Antelope and Santa Clarita Valleys. Buyer is advised to conduct their own independent investigation. For FAA requirements visit https://www.faa.gov/uas/ or download the FAA mobile app B4UFLY to verify restricted areas.

37. **Water System/Water Availability Investigation**: Buyer should determine the property's water source (i.e. if the Property has a public water source or other water delivery system, such as a mutual water company or well water system.)

If the Property is serviced by a mutual water company, Buyer is advised to conduct Buyer's own independent investigation of the financial solvency of the mutual water company and the reliability and quality of its water service. Buyer should also investigate what private conditions and approvals may be imposed by private water companies.

If the Property is not on a city, mutual water company, or equivalent water system, Buyer should read the Statewide Buyer and Seller Advisory. Buyer should determine whether water of sufficient quality and quantity will reliably be supplied to the Property. If the Property is serviced by a water well (on or off the Property), Buyer is advised to conduct an inspection and certification of the well servicing the Property to reveal both the condition of the well and the quality of the water. Buyer is aware that the quantity, quality and/or source of a well or wells located on or servicing the Property cannot be guaranteed, and may fluctuate from time to time and/or may go dry. Water wells can be costly. Other conditions may apply, including but not limited to the requirement of the development of public water systems within an area that becomes publicly funded by residents.

Buyer should consult appropriate professionals and the Los Angeles County Department of Public Health to satisfy any and all concerns with regard to wells and County guidelines and rules for issuing permits now and in the future. For more information, go to:
http://publichealth.lacounty.gov/eh/EP/dw/dw_well_water_owner.htm.

Additionally, if a well is shared, there may or may not be a shared well agreement in place. Buyer is advised to check with Seller and the Title Company whether any document exists with regard to a shared well, seek their own independent legal advice about the agreement or lack thereof and what this may mean for Subject Property now and in the future.

Buyer is notified that there has been an adjudication of water rights in what is known as the **Antelope Valley Ground Water Basin**. The Antelope Valley Watermaster is charged with administering adjudicated water rights and managing groundwater resources within the adjudicated portion of the Antelope Valley. To obtain information in regarding your water rights, contact the Watermaster at https://avwatermaster.net/about-us/ or call 661-234-8233.

Buyer is hereby expressly notified that construction of new commercial and industrial facilities and residential dwellings may be prohibited to land serviced by non-conforming water systems, such as "hauled" water, irrigation ditch water and public or community water systems that do not meet current legal Standards. Buyer is advised that lack of an adequate water supply may result in the denial of building permits for new construction on the Property, or for any additions or remodeling desired by Buyer to existing structures on the Property, as well as future effects including but not limited to possible increase in costs, future sale issues, future loan/refinance issues.

38. **Weather/Fire Protection/Emergency Health Transportation Issues**: Certain Rural property areas and Antelope Valley and the surrounding unincorporated communities may have icy and/or snow-covered roads and homes may need winterizing during winter months. Due to weather conditions, there may be power outages from time to time and highways may be closed for periods of time. Since some properties may be in mountainous and/or outlying areas, residents need to be aware of local fire protection procedures concerning their property and safety in these areas. Many areas also have brush clearance requirements and owners may be cited for non-compliance. Properties in the Rural Area may be covered by Cal Fire and not Local or County Fire services. Emergency response times may be lengthy due to rural location and/or weather conditions. Buyer is advised to investigate these matters with appropriate entities and agencies to satisfy any and all concerns.

39. **Wildlife:** Buyer has been informed various types of wildlife appear in residential neighborhoods throughout the Santa Clarita Valley, Antelope Valley and the surrounding unincorporated communities. Coyotes, bobcats, undomesticated cats, snakes, owls, and other birds of prey as well as other such wildlife may be injurious to people, property, pets, and small children. Buyer is advised to investigate this matter during their inspection contingency period.

40. **Wood Burning Stoves/Fireplaces:** Certain areas may have regulations currently in place or may have in the future which could restrict or prohibit the use of indoor and outdoor residential wood burning in wood burning stoves and/or fireplaces due to fire hazards and/or air quality matters. Certain properties may be exempt, such as, but not limited to mountain communities, homes that rely on wood as sole source of heat, low-income households, and those without natural gas service. For more information go to www.aqmd.gov or check with local and county entities for any regulations relating to the Subject Property.

41. **Wood Destroying Pest Reports**: In the event that Seller obtains more than one Wood Destroying Pest report pursuant to the current sale of Subject Property, Seller is required to provide copies of all such reports to the Buyer. If there is more than one report, Seller shall notify Buyer which company will be doing any corrective work and issuing the clearance. Seller's ability to comply with the Wood Destroying Pest provisions of the Purchase Contract may be impacted by the existence of any discrepancies contained within said reports. Buyer is aware the Structural Pest Control Report deals with wood destroying pests including termites and does not apply to the presence or absence of rodents, insects, or any other such "pests".

Santa Clarita Valley Disclosures

1. **Bermite:** Whittaker-Bermite is an approximately 1000-acre site adjacent to Circle J Ranch on the south, Soledad Canyon on the north, Golden Valley Road on the east, and Railroad Avenue on the west. This former munitions testing and manufacturing site has had contamination issues to soil and groundwater by perchlorates and other compounds. Certain water wells were shut down and clean-up efforts of the land continued for years and have been completed for future development by possibly Urban West to be called "Sunridge", which may include but is not limited to residential homes, commercial spaces, amphitheater, and park. However, cleanup efforts of the water wells may continue for years to come. There have been various plans for developments on the books since around May 1995. Included in the plans for development is the extension of Via Princessa from the 14 Freeway side through to the Circle J Ranch side and other changes. Exact timeline for future development is unknown at this time. For more information go to www.whittakerbermite.com or www.Santa-Clarita.com.

2. **Cogeneration and Operational Power Plants:** Buyer is advised there are cogeneration and operational power plants which utilize various fuels to produce electricity for on-site and off-site purposes. These plants are located in various areas, including but not limited to two plants in Placerita Canyon, Pitchess Detention Center in Castaic, Val Verde, Saugus, and Valencia. More information and lists of other possible plants can be found on the California Energy Commission website at www.energy.ca.gov.

3. **Hasley Canyon Area:** Buyer is advised there are future developments in the area of Hasley Canyon that may create future changes and additions to the area. There have been "discussions" and "meetings" relating to a possible bridge going in at Hasley and Sloan Canyon related to home developments in the area. There are various developments and projects going in Hasley Canyon. Brokers nor Agents have verified any information nor specifics of developments and projects, so Buyer should fully investigate with appropriate professionals and entities including but not limited to the Castaic Town Council, LA County Building and Safety and Planning Departments to satisfy and any all concerns. There is a low point in the roadway at Hasley and Del Valle that can flood during heavy rains and create dangerous conditions forcing the possibility of road closure in this area. Buyers are advised this may affect the Subject Property.

4. **Henry Mayo Newhall Memorial Hospital and Expansion**: Henry Mayo Newhall Hospital is a Level II Trauma Center. Emergency vehicles and air transport by helicopter are used to transport patients to the facility 24 hours per day. Buyer is advised the Henry Mayo Newhall Memorial Hospital is in the process of expanding the campus to include additional buildings and facilities. For additional information Buyer is advised to contact Henry Mayo Newhall Memorial Hospital and The City of Santa Clarita for the current status of the expansion, additional expansion information, and how these may affect the Subject Property. Buyer is advised to make an independent and complete investigation of the effects, if any, on the value, use, and enjoyment of the Subject Property.

5. **Mall Changes:** Santa Clarita has a mall that has been called Westfield Town Center Mall located between Valencia Boulevard and Magic Mountain Parkway. The entire area of the mall and parts of surrounding areas will be redesigned for mixed use of residential, commercial and entertainment facilities due to the sale of the mall by Westfield. Buyer is advised to investigate during their inspection contingency. For More Information go to: https://santaclarita.gov/planning/environmental-impact-reports-completed/town-center-specific-plan-2/
https://filecenter.santa-clarita.com/Planning/2024/05/TCSP%20CHAPTERS%201-3%20COMBINED_SCREEN.pdf

6. **Natural Gas Storage:** There are Natural Gas Storage facilities within the City of Santa Clarita and in unincorporated areas, including but not limited to Honor Rancho near Castaic. Buyer is advised to consult appropriate entities and professionals regarding natural gas storage sites that may affect Subject Property. For more information go to: https://www.conservation.ca.gov/calgem/Pages/UndergroundGasStorage.aspx and https://santaclarita.gov.

7. **Oil Derricks & Pollutants and Toxins**: Buyer is advised some known and/or alleged oil derricks and/or pollutants and toxin problems that may be around the area. Information can be found online at https://www.conservation.ca.gov/CalGEM.

8. **Placerita Canyon (West of 14 Freeway), Vista Tract Valle Del Oro/Flaxwood/Trumpet, etc., Hidden Knoll, Latana Hills Tracts re: Gate Cards/Dockweiler Extension/Future Changes**: Buyer is advised there is a gate at Placerita Canyon west of Sierra Highway and the 14 Freeway. Buyers who purchase homes in this area of Placerita Canyon should be aware there are requirements and a fee for gate access/cards. In addition, there are certain community standards for this side of Placerita Canyon area, future road changes and development. There are future changes to roadways on the West side of Placerita Canyon including but not limited to Dockweiler, currently a dead-end street on the East side, which is off Sierra Highway and dead ends around Valle Del Oro and the Hidden Knoll Tract of homes will eventually be a through street and widened which may impact parking that now occurs on Dockweiler and other streets for condos and apartments in that area. This will connect to 13th Street and there have been plans at one time to ask the railroad entities to allow for widening of 13th Street and changes to the area and roads. The open field at 13th, Arch and Alderbrook was approved to become a movie studio but as of late 2024, the land was put up for sale and it is unknown the future development that may take place in this area and on this land. Buyers may contact the City of Santa Clarita for more information and current updates.

Additionally, Placerita Canyon has continued changes due to The Masters University growth under an extensive Master Plan which has been extended, including but not limited to land being bought to build additional homes and structures including but not limited to a cathedral type chapel built between Placeritos and Placerita Canyon near Aden Avenue and west of Meadview. More information can be obtain through the City of Santa Clarita or at https://filecenter.santa-clarita.com/Planning/Master's%20University%20Master%20Plan%20-%202019.pdf.

Placerita Canyon has its own website http://www.pcpoa.com for more information and updates on the Canyon, public meetings and status of projects. Buyer can also contact the City of Santa Clarita for any and all projects within City limits. Buyers are advised to fully investigate during their investigation period in the Agreement to assess how future changes may impact Subject Property.

9. **Porter Ranch/Aliso Canyon Disclosure:** Buyer is advised of the existence of the Aliso Canyon Oil Field, located within close proximity to the Porter Ranch Area. Further, Buyer is informed that The Termo Company, owner of the existing wells along with several other oil and gas companies, has proposed to drill an additional number of new oil wells at this site. At this time, this proposal is under consideration and no final determination has been made as to whether or when such additional oil wells will be drilled. Seller and Brokers and their Agents do not have the expertise to advise.

Buyer is advised to investigate this matter during buyer's investigation contingency period. Buyer is advised to check with the appropriate county and city departments to obtain information regarding current status on any projects and regarding any impact, including but not limited to potential environmental impact of said drilling and more information may be obtained at http://www.caloes.ca.gov. (Search Aliso Canyon)

Buyer is advised that there was a major gas leak coming from a Southern California Gas Company storage facility in Aliso Canyon located in close proximity to the Porter Ranch area. The leak, coming from an underground well, released large quantities of methane gas. During the time of the leakage, residents of Porter Ranch complained of health issues including nausea, headaches, and nosebleeds. The gas company indicated that the leak began on or around October 23, 2015 and continued until on or around February 11, 2016. There are claims that additional leaking has occurred after the February 11, 2016 date. Seller and Brokers and their Agents do not possess the expertise to advise the Buyer on the impact of this leak on the subject property. Buyer is advised to do their own investigation of this matter during buyer's investigation period. Buyer may contact the Los Angeles County Department of Public Health at 888-700-9995 and the Southern California Gas Company at 800-427-2000 for further information. Buyer is advised to investigate on any impact said oil wells may have on the Subject Property during their investigation period in the agreement.

10. **Sand and Gravel Mining Operation Proposal**: Buyer is advised there is a proposal to expand the sand and gravel mining operation with appurtenant facilities, located at 12101 Soledad Canyon Road, Santa Clarita, CA 91390 (commonly known as CEMEX). Concerns have been expressed by the community regarding this project with respect to the possibility of creating noise, air pollution, and increased congestion from heavy truck traffic. For more information go to santaclarita.gov.

11. **Salt Water Pools:** The Santa Clarita Valley Sanitation District adopted an ordinance making it illegal for both new and existing "saltwater" pools to be connected to the sewer system. Buyer is advised to consult appropriate professionals and/or the Sanitation District at www.lacsd.org/chloride or call 1-877-Cut-Salt for further information regarding Salt Water Pools.

12. **Stevenson Ranch/Westridge Communities:** Buyer is advised the Law Firm Owen, Patterson and Owen filed a complaint in Los Angeles Superior Court on or around November of 2020, related to alleged violations with regard to sandblasting of two water towers located on Westridge Parkway in 2020, alleging various claims for damages. Status of the lawsuit is not known at this time. Buyer should consult Seller with regard to any current and/or past lawsuits regarding Subject Property during their investigation period in the agreement.

13. **Water Softeners**: Automatic or rock salt water softeners are illegal and banned in the Santa Clarita Valley. Door to door investigations can be made by officials and homeowners can be cited and fined up to $1,000. For more information contact the City of Santa Clarita or the Sanitation District of LA www.lacsd.org/chloride.

Acton and Agua Dulce Area Disclosures

1. **Agua Dulce Airpark/Airport:** Buyer is advised and hereby acknowledges the Subject Property may be located within close proximity to the private Agua Dulce Airpark. Buyer is hereby advised to investigate the hours of operation of the Airpark, types of aircraft (jet or otherwise) flying into and departing from the Airpark, types of flights (private or commercial) flying into and from the Airpark, flight patterns associated with the Airpark as well as any other related information concerning the actual or potential impact of the Airpark, including but not limited to any possible future expansion of the Airpark. For more information, go to www.l70airport.com.

2. **BESS- Battery Energy Storage Systems:** There are multiple and various projects associated with lithium batteries and large scale storage systems throughout Acton and Agua Dulce areas, including but not limited to The Hecate Humidor BESS is one such project, which would add approximately 300 megawatts to the grid using large lithium-ion batteries for storage, Avantus - Angeleno BESS Facility, and possibly more in the future, including but not limited to Flea Flicker-BESS, Maathai-BESS and Juniper & Quercus-BESS facilities. Buyer should fully investigate with appropriate professionals and entities to satisfy any concerns and refer to town council websites for Acton and Agua Dulce.

3. **Community Standards District:** Acton and Agua Dulce have active Town Councils and has developed a Community Standards District intended to help preserve the character of the community and addresses, including but not limited to, minimum lot size, residential and commercial development standards, street improvements, public trails, signage, the number of cargo shipping containers allowed, allowable home-based occupations, the number of dogs allowed, and the management protection of ridgelines and hillsides. Buyer should consult the Town Council, LA County Board of Supervisors, as well as Department of Regional Planning for more information and current standards and allowances pertaining to Subject Property. For more information, go to http://actontowncouncil.org/, www.adtowncouncil.com, and search planning.lacounty.gov/.

4. **Future Developments and Projects:** There continues to be growth of residential and commercial developments throughout Acton and Agua Dulce that are either already developed and/or are in the beginning to latter stages of approval. Buyer should fully investigate how any of these projects may impact Subject Property during their investigation period in the agreement including but not limited to local town meetings, local town councils, LA County Planning Department, LA County Building and Safety and other local and county agencies.

Antelope Valley Area Disclosures

1. **Airport Noise**: Buyer is advised that the Property may be situated in or near Air Force Plant 42, Edwards Air Force Base, Fox Field, Palmdale Airport, and the Rosamond Airport/Skypark, and/or the Mojave Air and Space Port, each of which facilities produce some level of aircraft traffic with resulting noise and other environmental issues. A Regional Terminal is proposed for construction at Columbia Way (Ave M) and Sierra Highway. Buyer is advised to make Buyer's own independent investigation of this during Buyer's physical inspection of the Property, if this is a matter of concern to Buyer.

2. **Antelope Valley Area Plan**: The Antelope Valley Area Plan ("Plan") was adopted June 16, 2015. The Plan is a component of the Los Angeles County General Plan that allows for more detailed policies to account for unique conditions specific to this geographical area. It is to be expected that the Plan will be updated from time to time to reflect changes in conditions in the area. The Plan has resulted in changes to previously permitted densities, imposes restrictions on property use and may otherwise impact a Buyer's intended use or development of property.

Other ordinances, either existing or proposed, such as the Significant Ecological Area Ordinance, the Renewable Energy Ordinance and the Hillside Management Ordinance may also impact the use, enjoyment and development of property in the unincorporated areas of the Antelope Valley. For more information, you are encouraged to visit: planning.lacounty.gov/.

3. **Flooding**: Flooding and flash flooding can occur throughout the Antelope Valley during storms, resulting in property damage, erosion and structural leaks.

Property Address: _____

4. **Landscape Laws and Ordinances:** The Cities of Lancaster and Palmdale have enacted landscape installation and maintenance ordinances which require the property owner to install and maintain landscape to certain minimum standards. If the property falls below these minimum standards, the property is subject to mandatory re-landscaping to meet water efficiency requirements established by the city and the State of California. Buyer and Seller are both advised of the necessity to maintain the landscape on the property at all times using water efficiency standards imposed by the Cities and/or water district providing service to the property. It is recommended the property owner review the current landscape and water efficiency ordinances and resolutions for the City in which the property is located. It is further recommended the property owner review current water restrictions with the water purveyor for the property. These ordinances contain monetary penalties and fines for noncompliance. The ordinances may be viewed on the City websites or secured at City Hall. Unincorporated areas are subject to statewide statutes and may be subject to local water conservation standards.

5. **Protected Species:** The California Fish and Game Commission is considering placing the Western Joshua Tree on a protected list, such as the endangered species list. Under a one-year status review, the Western Joshua Tree is protected under CESA as a candidate species. If a property contains Western Joshua Trees, Buyers are encouraged to perform their inspection and investigative obligations as to whether the presence of the Western Joshua Tree might affect the Buyer's use of the property. For more information on the current status of trimming or removing Joshua Trees, please visit https://wildlife.ca.gov/Conservation/CESA/WJT. See also the Los Angeles County SEA protected tree which covers oaks, junipers, and many other local species https://planning.lacounty.gov/wp-content/uploads/2022/11/Appendix-A-SEA-Protected-Tree-List.pdf.
Los Angeles County also has an ordinance specific to Oak Trees. Under the Los Angeles County Ordinance, a person shall not cut, destroy, remove, relocate inflict damage, or encroach into the protected zone of any tree of the oak tree genus, which is 8" or more in diameter four and one-half feet above mean natural grade or in the case of Oaks with multiple trunks a combined diameter of 12 inches or more of the two largest trunks, without first obtaining a permit. For more information visit: https://ucanr.edu/sites/oak_range/files/60602.pdf.

6. **Rental Housing License and Registration:** The Cities of Lancaster and Palmdale have enacted ordinances that require, among other things, that the owner or operator of residential rental property shall register the property with the appropriate city department, and/or secure a current rental housing business license. These ordinances provide for the inspection of the property, the payment of fees, and require that a Certificate of Inspection be secured and maintained for the property. Failure to comply with the ordinances can result in fines and other penalties. The ordinances may be reviewed on the City websites: Lancaster: www.cityoflancasterca.org Palmdale: www.cityofpalmdale.org. Unincorporated areas are subject to statewide statutes and subject to County ordinances which may also require licensing inspections and compliance.

Buyer and Seller are encouraged to read all 9 pages of this Advisory carefully.
By signing below, Buyer and Seller acknowledge that each has read, understands and received a copy of all 9 pages of this Advisory.

Seller acknowledges and represent they have fully and truthfully filled out this and all other disclosure documents. In addition, Seller acknowledges they did not rely upon either Broker or Agent for any information regarding this or any other disclosure document or the making, or omission, of any disclosure.
This information is true and correct to the best of my/our knowledge:

Seller Signature: _____ Date: _____

Seller Signature: _____ Date: _____

Buyer agrees to make an independent and complete investigation of the effects, if any, of the value, use, enjoyment and safety of the Subject Property regarding the items above during their investigation period specified in the Purchase Agreement. Buyer understands the items listed above are not an exhaustive list of all items that may affect the value, use, enjoyment and safety of the Subject Property, but is intended to provide some of the issues to assist them in their due diligence investigation of the property.

The real estate companies(s) and their agent(s) make no representations on these matters. As such, Buyer agrees to hold Broker(s) and Agent(s) harmless with regard to the above disclosures and information provided by the Seller, or information or disclosures the Seller has failed to provide.

Buyer Signature: _____ Date: _____

Buyer Signature: _____ Date: _____

ATTACHMENT 10
EXCERPT FROM THE LOS ANGELES COUNTY GENERAL PLAN LAND USE ELEMENT PERTAINING TO PURPOSES OF RURAL LAND USE DESIGNATIONS.

Table 6.2: Land Use Designations

Land Use	Code	Permitted Density or FAR	Purpose
RURAL			
Rural Land	RL1	Residential: Maximum 1 du/1 gross ac Non-Residential: Maximum FAR 0.5	Purpose: Single family residences; equestrian and limited animal uses; and limited agricultural and related activities.
	RL2	Residential: Maximum 1 du/2 gross ac Non-Residential: Maximum FAR 0.5	
	RL5	Residential: Maximum 1 du/5 gross ac Non-Residential: Maximum FAR 0.5	
	RL10	Residential: Maximum 1 du/10 gross ac Non-Residential: Maximum FAR 0.5	Purpose: Single family residences; equestrian and animal uses; and agricultural and related activities.
	RL20	Residential: Maximum 1 du/20 gross ac Non-Residential: Maximum FAR 0.5	
	RL40	Residential: Maximum 1 du/40 gross ac Non-Residential: Maximum FAR 0.5	

ATTACHMENT 11
ARTICLE PUBLISHED IN *NOISE AND HEALTH* ON LOW FREQUENCY NOISE.

Low frequency noise and annoyance

Article *in* Noise and Health · April 2004

Source: PubMed

1 author:

Geoff Leventhall
H G Leventhall
96 PUBLICATIONS **1,753** CITATIONS

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Low Frequency Noise and Annoyance

H.G. Leventhall

Noise and Vibration Consultant, Ashtead, Surrey, UK

Low frequency noise, the frequency range from about 10Hz to 200Hz, has been recognised as a special environmental noise problem, particularly to sensitive people in their homes. Conventional methods of assessing annoyance, typically based on A-weighted equivalent level, are inadequate for low frequency noise and lead to incorrect decisions by regulatory authorities.

There have been a large number of laboratory measurements of annoyance by low frequency noise, each with different spectra and levels, making comparisons difficult, but the main conclusions are that annoyance of low frequencies increases rapidly with level. Additionally the A-weighted level underestimates the effects of low frequency noises.

There is a possibility of learned aversion to low frequency noise, leading to annoyance and stress which may receive unsympathetic treatment from regulatory authorities. In particular, problems of the Hum often remain unresolved.

An approximate estimate is that about 2.5% of the population may have a low frequency threshold which is at least 12dB more sensitive than the average threshold, corresponding to nearly 1,000,000 persons in the 50-59 year old age group in the EU-15 countries. This is the group which generates many complaints.

Low frequency noise specific criteria have been introduced in some countries, but do not deal adequately with fluctuations. Validation of the criteria has been for a limited range of noises and subjects.

Keywords: Noise, low frequency noise, annoyance, subjective efforts, disturbance

Introduction

Low frequency noise, considered as the frequency range from about 10Hz to 200Hz, causes extreme distress to a number of people who are sensitive to its effects. The sensitivity may be a result of heightened sensory response, within the whole or part of the auditory range, or may be acquired. Onset of low frequency noise annoyance tends to occur in middle age. The noise levels are often low, in the region of a subject's hearing threshold, where there are large differences between individuals. The problem arises both in homes and in offices, or similar, premises. Whilst noise sources causing annoyance in the home may be unknown, in offices they are often fans or pumps in the building services. Similar plant, in those apartment blocks which have central services, may be the source of the noise in these premises, but a core of low frequency noise problems remain, of unknown origin, which continue to cause considerable annoyance. Low frequency noise problems also occur in industry, but generally at levels well above threshold, presenting a different noise problem to those in homes and offices.

Attempts to assess low frequency noise by conventional wide-band noise methods often fail, so illustrating the inadequacy of these methods for low frequencies. In particular, the regulatory dominance of A-weighted levels, leads to dismissal of valid problems of low frequency noise, so compounding the difficulties of some complainants

The World Health Organization recognizes the special place of low frequency noise as an environmental problem. Its publication on

Community Noise (Berglund et al., 2000) makes a number of references to low frequency noise, some of which are as follows

"It should be noted that low frequency noise, for example, from ventilation systems can disturb rest and sleep even at low sound levels"

"For noise with a large proportion of low frequency sounds a still lower guideline (than 30dBA) *is recommended"*

"When prominent low frequency components are present, noise measures based on A-weighting are inappropriate"

"Since A-weighting underestimates the sound pressure level of noise with low frequency components, a better assessment of health effects would be to use C-weighting"

"It should be noted that a large proportion of low frequency components in a noise may increase considerably the adverse effects on health"

"The evidence on low frequency noise is sufficiently strong to warrant immediate concern"

Annoyance

The meaning of annoyance

Annoyance has roots in a complex of responses, which are moderated by personal and social characteristics of the complainant. (Belojevic and Jokovljevic, 2001; Benton and Leventhall, 1982; Fields, 1993; Grime, 2000; Guski, 1999; Guski et al., 1999; Kalveram, 2000; Kalveram et al., 1999; Stallen, 1999).

For example, Guski (1999) proposes that noise annoyance is partly due to acoustic factors and partly due to personal and social moderating variables as follows:

Personal Moderators: Sensitivity to noise. Anxiety about the source. Personal evaluation of the source. Coping capacity with respect to noise.

Social Moderators: Evaluation of the source. Suspicion of those who control the source. History of noise exposure. Expectations

Noise annoyance in the home is considered as leading to a long-term negative evaluation of living conditions, dependent on past disturbances and current attitudes and expectations. Annoyance brings feelings of disturbance, aggravation, dissatisfaction, concern, bother, displeasure, harassment, irritation, nuisance, vexation, exasperation, discomfort, uneasiness, distress, hate etc, some of which combine to produce the adverse reaction.

Figure 1, modified from Guski (1999) in order to emphasise the central nature of the personal factors, summarises the interactions. The interpretation of Figure 1 is as follows. The noise load causes activity interference (e.g. to communication, recreation, sleep), together with vegetative reactions (e.g. blood pressure changes, defensive reactions). Interference with activity develops into annoyance and disturbance. Prolonged vegetative reactions may lead to effects on health. The personal factors interact with the outer boxes of Figure 1, moderating the complainant's complex of responses. The social factors moderate how the complainant interacts with external authorities in attempting to deal with the annoyance. Social factors may also interact with health effects, as some social classes may more readily seek medical assistance. The personal and social moderating factors are so variable that Grime (2000) questions the feasibility of developing a national noise policy.

Annoyance and the "meaning" of noise

Kalveram (2000) points out that much psychoacoustical noise research has limitations, because it is based upon the correlation between annoyance ratings and physical measurements of sound energy, often equivalent level, leading to noise dose. But equivalent level, A-weighted or linear, is only a part of the total process. Noise level and noise dose approaches neglect the "meaning" of a noise and are contrary to the interactive model in Figure 1. The noise level / noise dose assessment reduces Figure 1 to Figure

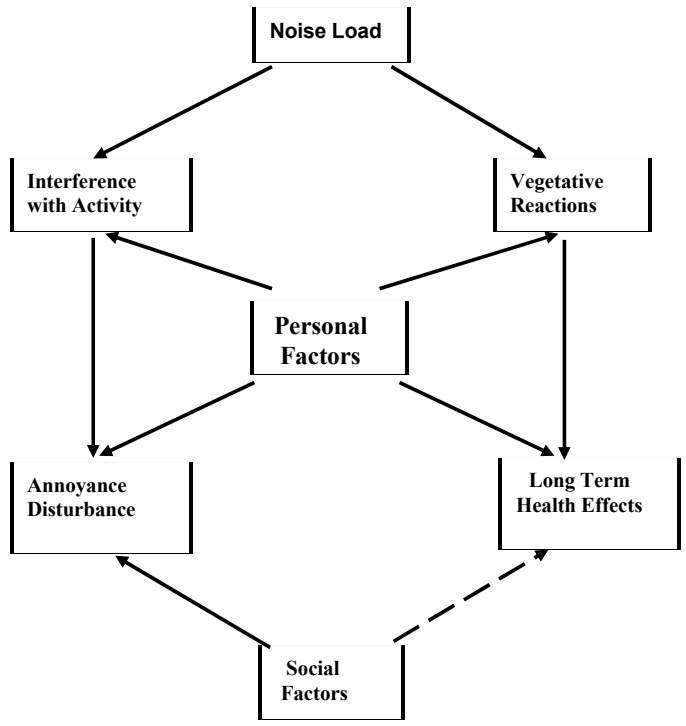

Figure 1. Factors moderating noise annoyance

2, in which the personal factors are constrained to those of the average person, so that only a limited number of subjects are protected by criteria which are developed from the assessment.

Kalveram proposes an "ecological" approach, which emphasises the psychological functions of sounds. Annoyance originates from acoustical signals which are not compatible with, or which disturb, these psychological functions. In particular, disturbance of current activities is a primary effect of noise exposure, producing a potential loss of fitness in the subject with respect to those behaviour patterns which permit coping with changes in the environment. Presence of a harmful sensory variable in the environment leads to actions which interrupt current behaviour, in an attempt by the subject to reduce the sensory input. This tests the coping capacity of the individual.

Those who have experienced long-term exposure to low frequency noise may recognise this within themselves. However, a few persons are known to have modified their responses to low frequency noise, thereby removing it from the category of a challenge and threat.

Most field work on noise annoyance has been where there is a known source, for example air or road transport. The particular circumstances of some low frequency noise problems, where the noise source is not known, adds an additional element to annoyance. Those affected suffer extreme frustration and may find it necessary to assume a source, thus enabling themselves to cope through provision of a focus for anger and resentment. Assumed sources have included neighbours, gas pipelines, radio transmissions and defence establishments.

Annoyance Measurements

Annoyance measurements are generally of the type described by Kalveram (2000), an attempt to relate annoyance ratings directly to measured noise levels. As described above, these measurements are limited in their results, since they deal with only part of the annoyance complex.

Laboratory determinations

There have been a large number of laboratory determinations of annoyance of low frequency sounds, mainly measurements using either 'normal' or 'sensitive' subjects. Stimuli have included tones, bands of noise or specially

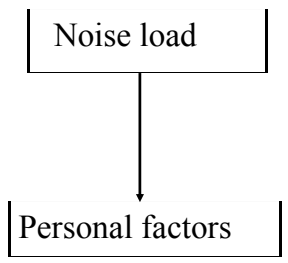

Figure 2. Noise dose interaction

developed spectra. There is, of course, a wide range of possible stimuli, which experimenters have chosen according to their experience of what is required (Adam, 1999; Andresen and Møller, 1984; Broner and Leventhall, 1978; Broner and Leventhall, 1984; Broner and Leventhall, 1985; Goldstein, 1994; Goldstein and Kjellberg, 1985; Inukai et al., 2000; Kjellberg and Goldstein, 1985; Kjellberg et al., 1984; Møller, 1987; Nakamura and Inukai, 1998; Persson and Bjorkman, 1988; Persson-Waye, 1985; Poulsen, 2002; Poulsen and Mortensen, 2002). Some of the laboratory studies have used recordings of real noises as stimuli, whilst others have worked with recordings of the actual noises as experienced by subjects in their own work places or homes. (Holmberg et al., 1993; Landström et al., 1994; Manley et al., 2002; Mirowska, 1998; Mortensen and Poulsen, 2001; Poulsen and Mortensen, 2002; Tesarz et al., 1997; Vasudevan and Gordon, 1977; Vasudevan and Leventhall, 1982).

Most determinations have been aimed at relating the A-weighted level, or some other derivative of the spectrum of the low frequency noise, to its annoyance. Whilst they are adequate studies, and have shown some general factors in low frequency noise annoyance, they are limited in that their results apply only to the particular noises investigated, often with a small number of subjects. It is unlikely that continued studies of this kind will result in step changes in our understanding of low frequency noise annoyance. However, Poulsen and Mortensen (2002) are an advance on previous work, as they compare subjective assessments with criteria, which have been developed in some European countries, specifically for assessment of low frequency noise.

Experimental methods

The responses required from subjects vary with experimental method. In laboratory investigations, subjects may be asked to '"imagine" themselves relaxing in their homes in the evening and to rate annoyance by, for example, choice on a semantic scale ranging from 'Not Annoying' to 'Extremely Annoying'. Other methods include marking the level of annoyance on an unnumbered linear scale at a point between 'Not at all annoying' and 'Very annoying', or assigning a number to a reference noise and appropriate numbers to other noises in order to estimate their magnitudes. These psychological techniques are well established, but need care in their performance, as they are sensitive to experimental factors.

Equal annoyance contours

The main results of this work are as follows. Møller (1987) investigated contours of equal annoyance for pure tones in the frequency range 4Hz to 31.5Hz. The annoyance contours are influenced by the narrowing of the range of equal loudness contours at low frequencies. Møller's results are shown in Figure 3. The vertical scale is the annoyance rating in terms of the distance marked for the tone along a 150mm linear scale. The lowest frequencies must be at a higher level than other frequencies in order to become audible but, once they are audible, their annoyance increases rapidly. For example, the scale rating range at 4Hz is about 10dB between extremes of annoyance. 8Hz and 16Hz have a 20dB range, whilst 31.5Hz has nearly 40dB range. The 1000Hz comparison, which is for an octave band of noise, has a range of nearly 60dB. These findings are important, as they confirm that the hearing contours are reflected in annoyance, although loudness and annoyance are not necessarily the same. Figure 3 gives averages for 18 subjects with normal hearing.

Individual annoyance functions

Broner and Leventhall (1978) measured individual annoyance functions for 20 subjects using ten low frequency noise stimuli. The

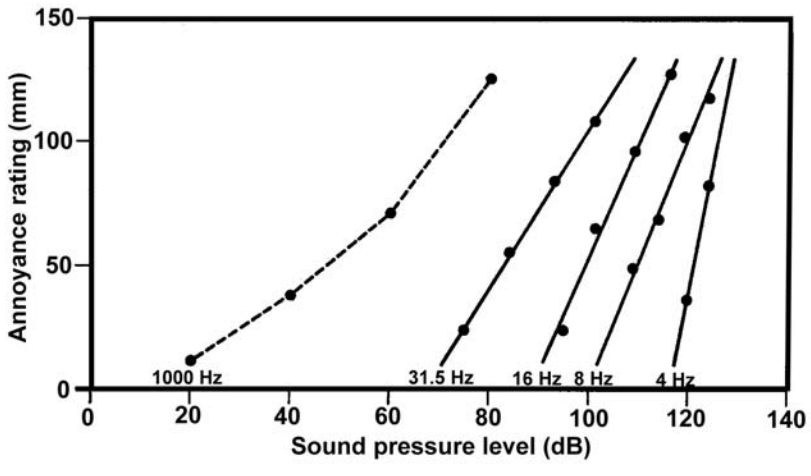

Figure 3. Annoyance rating, showing rapid growth at low frequencies

psychophysical function was assumed to be a simple power function

$$\psi = k\varepsilon^{\beta}$$

Where ψ represents the estimation of psychological magnitude, ε is the stimulus intensity and β a subject-specific exponent. It was shown that there was a wide range of individual exponents, β, from a low of 0.045 to a high of 0.4 and three groupings of individual differences were identified. Previous work at higher frequencies had also shown individual loudness functions (Barbenza et al., 1970) and had posed the question of whether one set of regulations should be applied to all people (Bryan and Tempest, 1973).

Annoyance and the dBA

A comparison of a band of noise peaking at 250Hz with a band peaking at 100Hz, whilst both were adjusted to the same A-weighted level, showed that the annoyance from the low frequency noise was greater than that from the higher frequency noise at the same A-weighted level (Persson et al., 1985) . This work was subsequently extended (Persson and Bjorkman, 1988; Persson et al., 1990) using a wider range of noises, for example, peaking at 80Hz, 250Hz. 500Hz and 1000Hz, leading to the following conclusions:

* There is a large variability between subjects.

*The dBA underestimates annoyance for frequencies below about 200Hz.

For broadband low frequency noise, the underestimate was found to be 3dB for levels around 65dB(Linear) and 6dB for levels around 70dB(Linear). Similar results had been obtained in earlier work (Kjellberg et al., 1984). Two broadband noises were investigated, in which one was dominated by energy in the 15-50Hz range. Twenty subjects compared the two noises within the dynamic range 49-86dBA. At equal A-weighted levels, the noise dominated by the low frequency component was perceived as 4-7dB louder and 5-8dB more annoying.

The energy input to the subjects was, of course, greater for the low frequency noises due to the attenuating effect of A-weighting, and it might be expected that there would be a greater effect, perhaps suggesting that loudness, assumed related to the A -weighting, differs from annoyance at low frequencies.

Unpleasantness

The “unpleasantness” of low frequency noise has also been estimated (Inukai et al., 2000; Nakamura and Inukai, 1998). Nakamura and Inukai used a stimulus sound of a pure tone in 20 conditions from 3Hz to 40Hz and sound pressure levels from 70dB to125dB, with evaluation by 17 subjects. There were four main subjective factors in response to low frequency noise: auditory perception, pressure on the eardrum, perception through vibration of the chest and more general feeling of vibration. Analysis of the responses showed that auditory perception was the controlling factor. That is, although high levels of low frequency noise may produce other sensations, the ear is the most sensitive receptor.

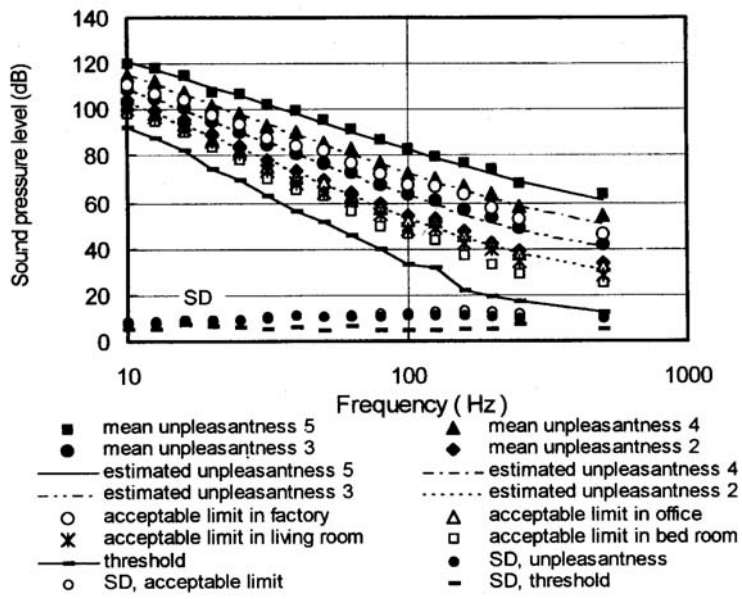

Figure 4. Equal unpleasantness contours and acceptable limits (Inukai)

Inukai et al (2000) determined "equal unpleasantness" contours for 39 subjects over a tone frequency range of 10Hz to 500 Hz. A verbal scale was used ranging through: *Not at all unpleasant (1) - somewhat unpleasant (2) – unpleasant(3) – quite unpleasant(4) – very unpleasant(5)*. Subjects in a test chamber were asked to assume different home and work situations and adjust the level of a tone to match a level on the scale, as requested by the experimenter. For example if instructed to match to level 4 (*quite unpleasant*), subjects would adjust the tone until they judged that this level was reached. Results are shown in Figure 4. The numbers 1,2,3,4,5 refer to the unpleasantness level. All levels of unpleasantness are approximately linear with a negative slope of 5 - 6dB per octave. The acceptable limits for different locations are all above the hearing threshold in this laboratory setting. For example, the self-adjusted acceptable limit in an assumed bedroom is more than 10dB above threshold, but this might not be replicated for long term exposure at night in a real bedroom.

Spectrum balance

The work by Inukai et al (2000) was for single tones. Spectrum balance has also been considered a factor in noise annoyance of a wideband spectrum. Correlation of a number of complaints with the corresponding spectra (Bryan, 1976) led to the conclusion that, for spectra which averaged as shown in Figure 5, a fall off above 32Hz of 5.7dB/octave was acceptable, whilst a fall off from 63Hz at 7.9 dB/octave was unacceptable. Work on acceptable spectra of air conditioning noise in offices led to similar conclusions (Blazier, 1981). Blazier found that, on average, acceptable office environments had a fall off of 5dB/octave. An excess of low frequency noise led to rumble, an excess of mid frequency noise led to roar, whilst an excess of high frequency noise led to hiss. Later work (Blazier, 1997) developed a "Quality Assessment Index" for an HVAC noise through the balance of low, mid and high frequencies.

(dBC – dBA) weighting.

The difference between C- and A-weightings has also been considered as a predictor of annoyance (Broner, 1979; Broner and Leventhall, 1983; Kjellberg et al., 1997), as this difference is an indication of the amount of low frequency energy in the noise. If the difference is greater than 20dB, there is the potential for a low frequency noise problem. Kjellberg et al used existing noise in work places (offices, laboratories, industry etc) with 508 subjects. Three sub- groups were obtained with a maximum difference in low and high frequency exposure. The conclusions on correlations of (dBC – dBA) difference and annoyance were that the difference is of limited value, but, when the difference exceeds 15dB, an addition of 6dB to the A-weighted level is a simple rating procedure. However, the difference breaks down

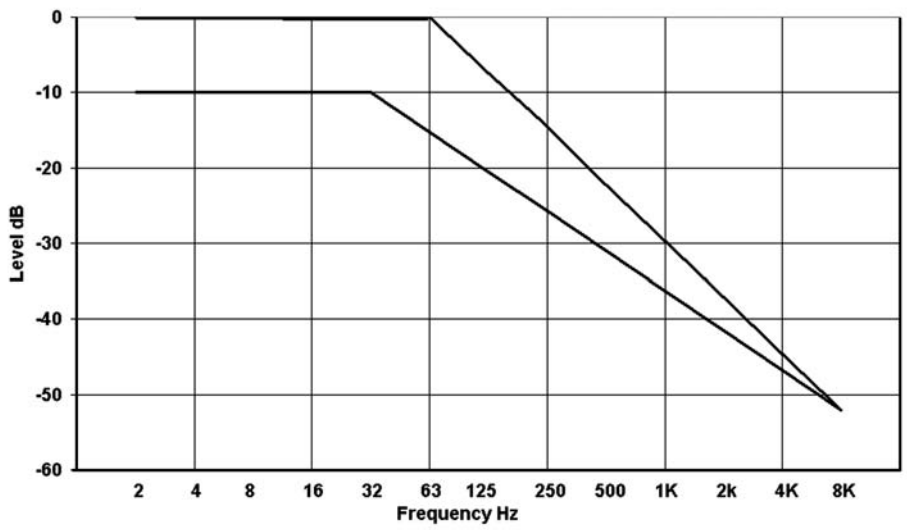

Figure 5. Acceptable and unacceptable spectrum slopes

when the levels are low, since the low frequencies may then be below threshold. The (dBC – dBA) difference cannot be used as an annoyance predictor, but is a simple indicator of whether further investigations may be necessary.

Home and work environments

Other studies, have assessed low frequency noise in real or assumed work environments or in the home (Bryan, 1976; Cocchi et al., 1992; Holmberg et al., 1997; Holmberg et al., 1993; Holmberg et al., 1996; Landström et al., 1993; Landström et al., 1994; Lundin and Ahman, 1998; Mirowska, 1998; Vasudevan and Gordon, 1977; Vasudevan and Leventhall, 1982).

Homlberg et al (1996 and 1997) assessed noise in real environments. The 1996 paper compared responses of about 240 subjects with the noise measures which might be available on a sound level meter i.e. dBLIN, dBA, dBB, dBC and dBD and the difference (dBC-dBA). Additionally, Zwicker loudness (ISO532, 1975) and Low Frequency Noise Rating (LFNR) (Broner and Leventhall, 1983) were calculated. There was poor correlation between the sound level meter weightings and annoyance. Similarly, the loudness in sones and the difference (dBC – dBA) did not correlate well.

The LFNR did separate out annoying and not annoying noises, but no more effectively than the (dBC – dBA).

Level variations

Holmberg et al (1997) investigated noise in workplaces, using the (dBC – dBA) difference as an indicator. Low frequency noise exposure was found in a group of 35 out of a total of 337 persons. Measurements of temporal variation of the levels of low frequency noise at the workplaces, averaged over 0.5, 1.0 or 2.0 seconds, was correlated with subjective annoyance. Significant correlation was found between the irregularity of the noise levels and annoyance.

This work represents an advance, in that it shows the importance of fluctuations in noise level. A limitation of much work on assessment of low frequency noise has been that long term averaged measurements were used and, consequently, information on fluctuations was lost, although complaints of low frequency noise often refer to its throbbing or pulsing nature. Broner and Leventhall(1983) had noted the importance of fluctuations and suggested a fluctuation penalty of 3dB in the Low Frequency Noise Rating Assessment. The importance of fluctuations has also been assessed in laboratory experiments (Bradley, 1994). Subjects listened first to steady wideband noises which peaked at 31.5Hz and adjusted the overall level of these to be equally annoying to a reference spectrum which fell at 5dB/octave. It was found that the more prominent the low frequency noise, the greater the reduction in level required for

equality of annoyance with the reference spectrum. The test spectra were now amplitude modulated, in the low frequency region only, at modulation frequencies of 0.25, 0.5, 1.0, 2.0 and 4.0Hz and depths of 10dB and 17dB. Subjects again adjusted the level of the noises to produce equal annoyance with the unmodulated reference noise. The reductions varied with modulation frequency and modulation depth. An example is that, for the highest modulation depth at 2.0Hz modulation frequency, the level was reduced by 12.9dB averaged over the subjects. This work confirms the importance of fluctuations as a contributor to annoyance, and the consequent limitation of those assessment methods which do not include fluctuations .

Field investigations

Vasudevan and Gordon (1977) carried out field measurements and laboratory studies of persons who complained of low frequency noise in their homes. A number of common factors were shown:

* The problems arose in quiet rural or suburban environments
* The noise was often close to inaudibility and heard by a minority of people
* The noise was typically audible indoors and not outdoors
* The noise was more audible at night than day
* The noise had a throb or rumble characteristic
* The main complaints came from the 55-70 years age group
* The complainants had normal hearing.
* Medical examination excluded tinnitus.

These are now recognised as classic descriptors of low frequency noise problems.

Further work in the laboratory showed that gradually falling spectra, as measured in the field and simulated in the laboratory, possessed a rumble characteristic. Figure 6 compares a measured noise on the left with a simulated noise on the right. Both fell at 7 – 8 dB/octave and had similar rumble characteristics. It is also known that a rapidly falling spectrum, such as one which follows the curve of the NR or NC ratings has an unpleasant quality. This was one reason for the development of the PNC rating as an improvement of the NC rating (Beranek et al., 1971). Further work (Vasudevan and Leventhall, 1982), confirmed that levels close to threshold caused annoyance, which increased if the noise also fluctuated. This work included spectra with tonal peaks and emphasised that the nature (quality) of the noise was important. Fluctuating noises are more annoying than predicted by their average sound levels.

Recent work on annoyance to people in their homes has been by Mirowska (1998) and Lundin and Ahman (1998). Both these papers considered annoyance due to plant or appliances, installed in, or adjacent to, living accommodation. Mirowska found problems from machinery, including transformers in electricity substations, ventilation fans, refrigeration units and central heating pumps. Lundin and Ahman investigated a husband and wife who experienced typical symptoms of aversion to low frequency noise. Refrigerators and freezers were suspected as the source of the offending noise which, in some parts of the building, was high at 50Hz. The time varying pattern of the noise, due to equipment cycling, was considered to add to its annoyance. However, there was no totally convincing link between effects on health and the noise.

Development of enhanced susceptibility.

It is known that different regions of the brain are responsible for different functions. The brain also possesses "plasticity", in the sense that parts within the same region may change their function. For example, extensive training in a frequency discrimination task in small mammals leads to improved discrimination ability and an expansion of the cortical area responsive to the frequencies which were used during training. (Schnupp and Kacelnick, 2002).

In humans, there is considerable plasticity in the brain during its early development, requiring appropriate stimuli for proper growth. Plastic adaptation is slower in the adult brain. Two examples of plastic adaptation are:

London taxi drivers are required to memorise many routes through London. Magnetic resonance imaging showed that the part of the brain associated with spatial navigation, the posterior hippocampus, enlarged at the expense

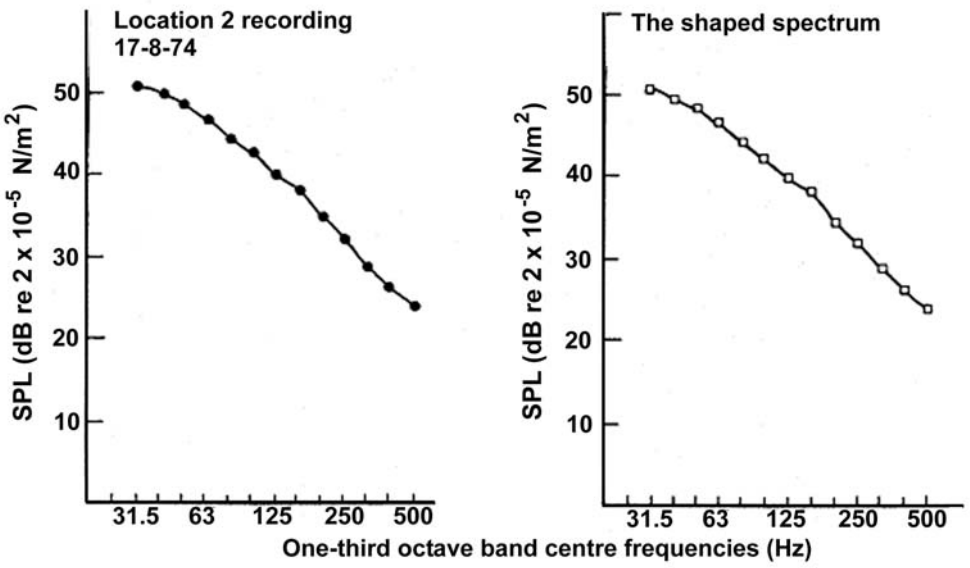

Figure 6. Measured spectrum (left) and simulated spectrum (right)

of neighbouring regions.(Maguire et al., 2000). There has been a similar finding for skilled musicians (Pantev et al., 1998). Cortical reorganisation was greater the younger the age at which music training began.

The significance of these findings for low frequency noise annoyance is:
There is clear evidence that the brain is able to adapt to stimuli.
If complainants spend a great deal of time listening to, and listening for, their particular noise, it is possible that they may develop enhanced susceptibility to this noise.

Enhanced susceptibility is therefore a potential factor in long-term low frequency noise annoyance.

Low frequency noise annoyance and stress

Stresses may be grouped into three broad types: cataclysmic stress, personal stress and background stress. Cataclysmic stress includes widespread and devastating physical events. Personal stress includes bereavements and other personal tragedies. Cataclysmic and personal stresses are evident occurrences, which are met with sympathy and support, whilst their impacts normally reduce with time. Background stresses are persistent events, which may become routine elements of our life. Constant low frequency noise has been classified as a background stressor (Benton, 1997; Benton and Leventhall, 1994). Whilst it is acceptable, under the effects of cataclysmic and personal stress, to withdraw from coping with normal daily demands, this is not permitted for low level background stresses. Inadequate reserves of coping ability then leads to the development of stress symptoms. In this way, chronic psychophysiological damage may result from long-term exposure to low-level low frequency noise.

Changes in behaviour also follow from long-term exposure to low frequency noise. Those exposed may adopt protective strategies, such as sleeping in their garage if the noise is less disturbing there. Or they may sleep elsewhere, returning to their own homes only during the day. Others tense into the noise and, over time, may undergo character changes, particularly in relation to social orientation, consistent with their failure to recruit support and agreement from the regulatory authority that they do have a genuine noise problem. Their families, and the investigating officer, may also become part of their problem. The claim that their "lives have been ruined" by the noise is not an exaggeration, although their reaction to the noise might have been modifiable at an earlier stage.

The HUM

Occurrence

Hum is the name given to a low frequency noise

which is causing persistent complaints, but often cannot be traced to a single, or any, source. If a source is located, the problem moves into the category of engineering noise control and is no longer "the Hum", although there may be a long period between first complaint and final solution. The Hum is widespread, affecting scattered individuals, but periodically a Hum focus arises where there are multiple complaints within a town or area. There has been the Bristol Hum (England), Largs Hum (Scotland), Copenhagen Hum (Denmark), Vancouver Hum (Canada), Taos Hum (New Mexico USA), Kokomo Hum (Indiana USA) etc. A feature of these Hums is that they have been publicised in local and national press, so gathering a momentum which otherwise might not have occurred, possibly increasing the number of adverse reactions. Although the named Hums, such as Kokomo, have gained much attention, they should not be allowed to detract from the individuals who suffer on their own.

Hum character

The sound of the Hum differs between individuals. Even in the areas of multiple complaints, the description is not completely consistent, although this may be because people use different words to describe the same property of a noise. Publicity tends to pull the descriptions together. The general descriptors of the sound of the Hum include: a steady hum, a throb, a low speed diesel engine, rumble and pulsing. A higher pitch, such as a hiss, is sometimes attributed. The effects of the Hum may include pressure or pain in the ear or head, body vibration or pain, loss of concentration, nausea and sleep disturbance. These general descriptions and effects occur internationally, with close similarity.

Unsympathetic handling of the complaint leads to a build-up of stress, which exacerbates the problems. Hum sufferers tend to be middle aged and elderly, with a majority of women. They may have a low tolerance level and be prone to negative reactions. The knowledge that complaints are being taken seriously by the authorities helps to reduce personal tensions, by easing the additional stresses consequent upon not being believed. This is particularly so when, as is often the case, only one person in a family is sensitive to the noise. Whilst some Hum sufferers may have tinnitus, they will, of course, also be troubled by intruding noise at a different frequency from their tinnitus. Tinnitus should not be used as a reason to reject a complaint of low frequency noise annoyance.

Psychological aspects of the Hum

Psychosocial factors affect the physiological impact of noise (Hatfield et al., 2001). Adverse physiological consequences may be mediated by psychological factors related to the noise exposure. It is plausible that excessive noise exposure promotes negative psychological reactions, leading to adverse physiological effects, as was shown by Hatfield et al.(2001). Therefore, psychological factors must be addressed to help ameliorate the annoyance of low frequency noise.

Some Hum sufferers have achieved this for themselves, saying that they have "learnt to live with the Hum" so that it no longer worries them. Others are "cured" by prescription of relaxant drugs. For a few, the Hum goes away after a time. Some escape the Hum by moving house. One long term sufferer, and leading campaigner for official help with low frequency noise problems, decided that it was time to leave the low frequency forest of chaotic emotions and now has no problem, remaining detached from low frequency noise and of the opinion that to become involved with other sufferers heightens ones awareness of the noise. Some sufferers accept that the noises are not at a high level, but that their reactions are equivalent to those which might be expected from a high level of noise – "As soon as I hear the noise, something builds up inside me". This is a similar response to that of hyperacusis sufferers, although more specialised in its triggers. A form of hyperacusis may be indicated.

Combined acoustical and psychological studies (Kitamura and Yamada, 2002) have explored involvement of the limbic system of the brain in

annoyance responses[1]. The limbic system commands survival and emotional behaviours, which we cannot always control, although we may learn to do so.

The Hum remains a puzzling aspect of low frequency noise. No widespread Hum has been unequivocally traced to specific sources, although suspicion has pointed at industrial complexes, especially fans.

In the absence of known sources, Hum sufferers often search their neighbourhoods for a source, walking or driving around at night. It is important for them to find a target for their frustrations. Some general ones include their neighbours, the main gas pipelines, radio transmissions (particularly pulsed signals for navigation), defence establishments etc.

Auditory sensitivity

Special difficulties arise when, despite persistent annoyance, there is no "measurable" noise or, as might occur in urban areas, the noise levels at low frequencies are in the 40 - 50dB range, well below the average threshold (ISO:226, 1987). Van den Berg supports tinnitus as an explanation in these circumstances (van den Berg, 2001). With respect to audibility, the average ISO:226 threshold levels must be interpreted carefully. Van den Berg's choice of a limit criterion is the low frequency binaural hearing threshold level for 10% of the 50 – 59 year old population, which is 10-12 dB below their average hearing level (van den Berg and Passchier-Vermeer, 1999a). This may be too restrictive a cut off, since 10% of the age group has more sensitive hearing. For example, the population of the EU-15 countries is 379,000,000. There are differences between north and southern European countries, but approximately 10% of the population is in the 50 – 59 year age group. Thus, about 3,800,000 of the 50 – 59 year age group of the European population (10% of 10% of the total) will be more sensitive than the suggested cut-off for assessment of low frequency noise for this age group. A smaller number will have greater sensitivity. Yamada found one subject to be 15dB more sensitive than the average (Yamada, 1980), whilst recent work (Kitamura and Yamada, 2002), gives two standard deviations from the average threshold as about 12dB. However, the average threshold of the complainants in this work is somewhat higher than the ISO 226 threshold, as might be expected for older people. A range of two standard deviations covers 95% of people. Of the remaining 5%, half are more sensitive than two standard deviations from the average and half are less sensitive. In the EU-15 countries, 2.5% of the population is about 10,000,000 persons of whom around 1,000,000 are in the 50-59 year old age group, who might have very sensitive low frequency hearing and be prone to annoyance from sounds which are not heard by most people and which are difficult to measure. The unfortunate association of one of these people with a low level, low frequency noise leads to considerable distress for the person concerned. A "rule of thumb" may be to take 15 - 20dB below the ISO 226 threshold as the cut off for perception, but this may be a generous level, depending on the complainants' individual threshold at low frequencies.

The preceding deductions on numbers of persons are clearly approximate, but are sufficient to give an "engineering" indication of the extent of the problem.

Criteria for low frequency noise control.

A number of criteria have been developed for assessment of low frequency noise. (Broner and Leventhall, 1983; Challis and Challis, 1978; Inukai et al., 1990; Vercammen, 1989; Vercammen, 1992).

In recent years, some European countries have adopted national criteria for low frequency

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[1] *The human brain has three layers representing its three stages of development. The primitive (reptilian) brain is connected with self preservation. The intermediate (old mammalian) brain is the brain of the inferior animals and related to emotions. This is the limbic system. The superior (new mammalian) brain is related to rational thought and intellectual tasks. The limbic system is activated by perceived threats.*

Table 1. Test noises

No	Name	Description	Tones, characteristics
1	Traffic	Road traffic noise from a highway	None – broadband, continuous
2	Drop forge	Isolated blows from a drop forge transmitted through the ground	None – deep, impulsive sound
3	Gas turbine	Gas motor in a C HP plant	25 Hz, continuous
4	Fast ferry	High speed ferry; pulsating tonal noise	57 Hz, pass-by
5	Steel factory	Distant noise from a steel rolling plant	62 Hz, continuous
6	Generator	Generator	75 Hz, continuous
7	Cooling	Cooling compressor	(48 Hz, 95 Hz) 98 Hz, continuous
8	Discotheque	Music, transmitted through a building	None, fluctuating, loud drums

noise, including Sweden ((Socialstyrelsen-Sweden, 1996)), Denmark (Jakobsen, 2001) Netherlands ((N S G, 1999) Germany (DIN:45680, 1997) , Poland (Mirowska, 2002). Some of these methods assume a threshold curve for limitation of annoyance, based approximately on the ISO226 threshold, or a curve parallel to this threshold, but extended to frequencies below 20Hz.

The criteria have been compared under laboratory conditions for some specific noises (Poulsen, 2002; Poulsen and Mortensen, 2002). Noises used were eight recorded samples of different types as shown in Table 1.

The noises were judged by 18 otologically normal young listeners and by four older people (41-57 years) who had made complaints of annoyance by low frequency noise. Judgements were made under assumed listening circumstances of day, evening and night. The complaint group rated the noises to be more annoying than the other group did. Overall, the Danish method gave highest correlation between objective and subjective assessments, but only when a 5dB penalty for impulsive sounds was included.

Conclusions

Regulatory authorities must accept that annoyance by low frequency noise presents a real problem which is not addressed by the commonly used assessment methods. In particular, the A-weighted level is very inadequate, as are the NR and NC criterion curves. Assessment methods specific to low frequency noise are emerging, but a limitation of existing methods is that they do not give full assessment of fluctuations. It is possible that application of noise quality concepts, in particular fluctuation and roughness (Zwicker and Fastl, 1999), may be a way forward.

Acknowlegement

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ATTACHMENT 12
EXCERPT FROM CAISO GOVERNING BOARD REPORT ADDRESSING VINCENT SUBSTATION TRANSFORMER FIRE EVENT IN 2003.

CALIFORNIA ISO

Memorandum

To: ISO Board of Governors

From: Anjali Sheffrin, Ph.D., Director of Market Analysis

cc: ISO Officers, ISO Board Assistant

Date: April 18, 2003

Re: Market Analysis Report for March 2003

This is a status report only. No Board Action is required.

Executive Summary

During March, natural gas prices receded to the January levels of $4 to $5/MMBtu from the high prices that occurred in late February and early March. Day-ahead bilateral electricity prices fell in step with the lower fuel costs. Several price spikes occurred in March due to the need to dispatch higher cost peaking units to meet evening load ramps and during late evening hours when standard bilateral contract products for peak-hour energy deliveries end. In addition, on March 21, an explosion of a transformer bank at the Vincent substation in Southern California resulted in the ISO having to completely derate Path 26, a key transmission artery between Northern and Southern California. ISO operators and utility workers worked to partially restore flows on Path 26 to 600-925 MW by March 23, and were able to restore the path to its full capacity of 2500-3000 MW by early April. The capacity derates on Path 26 caused significant interzonal and intrazonal congestion around the State through the end of the month.

I. Electricity Market Trends through Q1 2003

Loads and Schedules. Loads during March 2003 were slightly higher than those seen in March 2002, due primarily to warm temperatures during the final week of the month, and on March 31 in particular. Daily load averaged 24,334 MW or 0.7 percent above the average for March 2002. The actual peak load of 31,151 MW occurred on March 31, 2003. The March 2003 peak load was 4.7 percent higher than the March 2002 peak. Energy consumption was 2.0 percent higher than that of March 2002. The following chart compares actual hourly loads in March 2002 and 2003.

ATTACHMENT 13
EXCERPTS FROM KERN COUNTY FIRE DEPARTMENT INCIDENT REPORTS FOR MULTIPLE BESS FIRE RESPONSES AT THE SANBORN BESS.
(NFIRS1S SUPPLEMENTALS)

July 14, 2024

NFIRS-1S Supplemental

A

FDID	State	Month	Day	Year	Station	Number	Exposure
15010	CA	07	14	2024	K14 (14)	2431514	0

Additional Narrative (#1 of 1):

E14 responded to a fire alarm at 9900 Lone Butte road, which is a solar and energy storage facility. E14 was led in by an on scene maintenance worker. Upon approaching the B.E.S.S. Area of the facility, smoke was visible from a distance. Crews remained upwind and stayed at a safe distance to identify that there was a fire in one of the units. A structure response was then started. The wind was out of the west pushing the smoke east where there were no homes for 20 to 30 miles. With the arrival of the site S.M.Es, a plan would be put into place to shut down the fire pump before the tank would run dry. When the smoke started to dissipate, crews went to the fire pump which was located upwind from the involved unit, and were able to shut it off. The water supply tank was found empty. At that time the pump had been running for 1 and half hours. E14 remained on scene with the facility employees until Fire prevention and Kern County Health Department arrived.

Apparatus Narrative for E15:

E15 staged on-scene and then released by IC

Sept. 18, 2024

NFIRS-1S Supplemental

A

FDID	State	Month	Day	Year	Station	Number	Exposure
15010	CA	09	18	2024	K14 (14)	2443063	0

Additional Narrative (#1 of 1):

E14 arrived on scene to find an ESS unit smoking. E14 named the incident lone butte. The unit number that was smoking was 45B1. The unit had its power shut off on Saturday and the valve for water turned off due to a problem with the unit. Usually the water would be injected into the system but that valve is off. The company was going to have a fire watch for the rest of the night. Units were not going close to the unit due to the health hazards it presents. To put that fire out it would take more water than was available on scene so units watched from a distance.

The unit caught fire as units were leaving. E14 and B1 returned to the scene. E14 sent the drone to make sure none of the other units were on fire. The ESS units to the east, south and west did not catch fire. Environmental health was notified. E14 monitored the air with a five gas meter and all readings were normal. All were zero and oxygen levels at 20.5. E14 went to trotter area and monitored the air due to residents in the area. All readings were the same. The company was going to stay on scene with Edward's fire department and monitor throughout the night.

Apparatus Narrative for E12:

Cancelled en route.

Apparatus Narrative for E13:

Cancelled en route.

Apparatus Narrative for E15:

E15 arrived on scene and staged near E14. E15 was cleared shortly after by BC1. E15 completed.

Apparatus Narrative for KB1:

Enroute I made contact with Environmental Health (EH). The facility had a fire on Saturday 9/14/2024 in the same enclosure 45B1. I advised EH I would give them more information when I arrived on scene. Based on the size up with CO-14 I cancelled the Structure Fire Reinforced and then eventually cancelled E-12. I arrived on scene and made contact with the IC-CO14 and the Operations Manager Cole Berman from Terra-Gen. Crews had already deployed their drone and at that time there were no immediate life safety hazards. Light smoke was coming from enclosure 45B1. I made contact with EH again and they advised Cole to make all the proper notifications again, due to this being a new incident. KCFD monitored with Edwards Fire Department for over an hour. Crews completed and left scene with Terra-Gen to stay on 24hr fire watch.

While leaving the facility and still on the property I was notified by CO-14 that the enclosure was now on fire. E-14 and Battalion 1 responded back to scene along with Edwards Fire Department. I assumed Butte Command. We set up an ICP and crews monitored the area with a five gas monitor. Crews deployed the drone again to make sure no exposures caught fire. I went into unified command with Edwards Fire Department Battalion Chief. Crews stayed on scene approximately two hours monitoring the incident. I had 14 get me a reading with their five gas monitor at the nearest housing tract to the incident. No hazardous materials were detected and the O2 level was appropriate. I stayed into the enclosure had minimal flames and then the scene was left with Edwards Fire Department and Terra-Gen. I made contact with Kern County Fire Department Prevention and they advised they were going to respond to the scene.

Apparatus Narrative for SF3:

Cancelled en route

Feb 22, 2024

NFIRS-1S Supplemental

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FDID	State	Month	Day	Year	Station	Number	Exposure
15010	CA	02	22	2024	K14 (14)	2408035	0

Additional Narrative (#1 of 1):

On February 22nd, 2024, at approximately 1600 hours, fire personnel from Kern County Fire and Cal City Fire were dispatched to reports of a fire within a BESS (Battery Energy Storage System) container at Terra Gen's Edwards site. Upon arrival, firefighters observed smoke developing from the reported location. Company 14 (Co14) made direct contact with the on-site representative, who guided them to the affected area. The representative shared surveillance footage showing the fire inside the container. Co14 confirmed that all personnel on site were accounted for and there were no immediate concerns for life safety.

Engine 14 (E14) and Medic Squad 15 (MS15) arrived at the designated Incident Command Post (ICP) with the site representatives to witness the smoke subsiding. On-site staff informed them that the cooling system within the container was actively circulating water. It was decided to maintain a distance of approximately 1000 feet from the burning container at the ICP, allowing the cooling system to continue its operation and prevent further entry. KCFD crews assisted on-site personnel in shutting down the system when the water tank reached critical levels. Approximately 2000 gallons remained in the 12,000-gallon tank. The cooling system successfully extinguished the fire.

E14 remained on the scene alongside KB1 until the Site Manager, General Manager, and Assistant Fire Marshal arrived. KB1 contacted the Environmental Health (EH) department and the US Environmental Protection Agency (EPA) to ensure compliance with all necessary protocols and procedures. The plan moving forward involved leaving the scene under the care of Terra Gen, implementing an approved "Fire Watch" until the water system was restored, all batteries were removed from the container, and the affected container's fire alarm and water system were fully operational. The estimated timeframe for completion ranged from 14 to 30 days. Terra Gen would open the container at a later date once all required criteria were met.

Apparatus Narrative for E12:

Staged then cancelled.

Apparatus Narrative for E13:

Staged and then released

Apparatus Narrative for E14:

E14 arrived to a large solar farm that also had multiple Battery Energy Storage Systems (BESS)in use. 14 was met at the entrance by an employee who stated that one of the BESS was smoking and he provided cell phone video of it. 14 confirmed with that employee that all other employees were evacuating from the premises. E14 became Mojave command. We were then led about a mile into the facility where the alarm panel was located, which was about 1000' from the affected BESS. From that distance we could see that the smoke was dissipating. The employees confirmed that a water suppression system had been activated. Battalion 1 arrived on scene and took command and assigned E14 Fire Attack. E14 then made a reconnaissance drive around the facility and confirmed that there was still water left in the suppression tank and that no more smoke was coming from the BESS. We then continued to monitor with the employees from a distance for the next couple of hours.

Apparatus Narrative for HM65:

KB1 contacted Co65 to confer about incident hazards.

Apparatus Narrative for KB1:

KB1 arrived on scene, assumed command. Throughout the incident, KB1 made contact with Div1, HM65, EH, EPA, Terra Gen Site and General Managers, to ensure that our plan could be implemented, accounting for the protection of Life, Property, and the Environment.

Apparatus Narrative for MS15:

Assisted E14 with isolation and denying entry.

Apparatus Narrative for SF4:

SF4 was dispatched and responded to a fire in 14's area. SF4 was canceled enroute by Battalion 1.

Apparatus Narrative for WT12:

WT12 arrived on scene with the intent of water supply. The operation changed and WT12 was no longer needed and was completed.