CLAIMS

1. A computer-implemented method comprising:

detecting, by a processor and using a first machine learning model, a first well pad at a first location based at least in part on a first set of data comprising spectral data describing a gas emission from the first location;

detecting, by the processor, an environmental event within a threshold distance of the well pad;

determining, by the processor, a probability of damage to the first well pad from the environmental event; and

predicting a suitable location for a second well pad at a second location without a well pad based at least in part on a similarity of a terrain of the second location and the first location and a probability of damage due to the environmental event at the second location.

2. The computer-implemented method of claim 1, wherein the environmental event is a fire, landslide or flooding.

3. The computer-implemented method of claim 1 further comprising extracting, using a second machine learning model, features from the first set of data to determine the terrain of the location.

4. The computer-implemented method of claim 1 further comprising encoding the data to delineate a boundary of a potential well pad, based at least in part on the terrain.

5. The computer-implemented method of claim 4, wherein the first machine learning model determines whether the bounded potential well pad is a source of the gas emission.

6. The computer-implemented method of claim 1 further comprising determining an identity, composition and volume of the gas emission and compare emissions with regulatory requirements.

7. A system comprising:

a memory having computer readable instructions; and

one or more processors for executing the computer readable instructions, the computer readable instructions controlling the one or more processors to perform operations comprising:

detecting, using a first machine learning model, a first well pad at a first location based at least in part on a first set of data comprising spectral data describing a gas emission from the first location;

detecting an environmental event within a threshold distance of the well pad;

determining a probability of damage to the first well pad from the environmental event; and

predicting a suitable location for a second well pad at a second location without a well pad based at least in part on a similarity of a terrain of the second location and the first location and a probability of damage due to the environmental event at the second location.

8. The system of claim 7, wherein the environmental event is a fire, landslide or flooding.

9. The system of claim 7, the operations further comprising extracting, using a second machine learning model, features from the first set of data to determine the terrain of the location.

10. The system of claim 7, the operations further comprising encoding the data to delineate a boundary of a potential well pad, based at least in part on the terrain.

11. The system of claim 10, wherein the first machine learning model determines whether the bounded potential well pad is a source of the gas emission.

12. The system of claim 7, the operations further comprising determining an identity, composition and volume of the gas emission and compare emissions with regulatory requirements.

13. A computer program product comprising a non-transitory computer readable storage medium having program instructions embodied therewith, the program instructions executable by a processor to cause the processor to perform operations comprising:

detecting, using a first machine learning model, a first well pad at a first location based at least in part on a first set of data comprising spectral data describing a gas emission from the first location;

detecting an environmental event within a threshold distance of the well pad;

determining a probability of damage to the first well pad from the environmental event; and

predicting a suitable location for a second well pad at a second location without a well pad based at least in part on a similarity of a terrain of the second location and the first location and a probability of damage due to the environmental event at the second location.

14. The computer program product of claim 13, wherein the environmental event is a fire or flooding.

15. The computer program product of claim 13, the operations further comprising extracting, using a second machine learning model, features from the first set of data to determine the terrain of the location.

16. The computer program product of claim 13, the operations further comprising encoding the data to delineate a boundary of a potential well pad, based at least in part on the terrain.

17. The computer program product of claim 16, wherein the first machine learning model determines whether the bounded potential well pad is a source of the gas emission.