Claims

1. A method of scanning a chemical processing vessel and diagnosing a problem within the chemical processing vessel and/or a problem with a process occurring within the chemical processing vessel, the method comprising:

scanning the chemical processing vessel (4) with at least one radiation source (2) and at least one detector (3) to generate density profile data for the chemical processing vessel;

saving the density profile data;

generating a representation of the chemical processing vessel;

associating the density profile data with the representation of the chemical processing vessel whereby each data point of the density profile data is associated with a corresponding location along the representation of the chemical processing vessel indicating the location from which the data point was obtained;

displaying the representation of the chemical processing vessel alongside the associated density profile data on a user interface;

wherein the user interface is configured to enable a user to select a portion of the representation of the chemical processing vessel on the user interface and to automatically display a corresponding portion of the density profile data in expanded form, whereby said portion of the density profile data can be analysed by the user in greater detail;characterised by associating the saved density profile data with a date on which the density profile data was captured, and

wherein the user interface is configured to enable a user to simultaneously display density profile data captured on two or more different dates to identify changes in the density profile data associated with a representation of chemical processing vessel (4).

2. A method according to claim 1,

wherein the user interface is configured to enable a user to select a portion of the representation of the chemical processing vessel on the user interface and to automatically display a corresponding portion of the density profile data in expanded form for said two or more different dates, whereby said portion of the density profile data for said two or more different dates can be analysed by the user in greater detail to identify changes in said portion of the density profile data.

3. A method according to claim 2,

wherein the density profile data captured on two or more different dates is displayed side-by-side and aligned such that adjacent density profile data corresponds to the same location along the chemical processing vessel (4).

4. A method according to claim 2,

wherein the density profile data captured on two or more different dates is displayed in overlayed form and aligned such that adjacent density profile data corresponds to the same location along the chemical processing vessel (4).

5. A method according to any preceding claim,

wherein the representation of the chemical processing vessel (4) displayed on the user interface is a longitudinal representation of the chemical process vessel (4).

6. A method according to claim 5,

wherein the user interface is configured to enable a user to select a portion of the longitudinal representation of the chemical processing vessel (4) and to display a cross-sectional representation of the selected portion along with density profile data for said cross-sectional representation.

7. A method according to claim 6,

wherein the density profile data includes density data captured at different angular orientations around the chemical processing vessel (4), and the user interface is configured to display density data captured at different angular orientations around the chemical processing vessel (4) for the selected portion of the longitudinal representation of the chemical processing vessel (4).

8. A method according to any preceding claim, wherein the or each radiation source (2) is a gamma radiation source.

9. A method according to any preceding claim, wherein the chemical processing vessel is a distillation tower, storage tank, or separator vessel.

10. A method according to any preceding claim,

wherein the method further comprises controlling the chemical processing vessel and/or the process occurring within the chemical processing vessel based on said analysis.

11. A scanning system for scanning a chemical processing vessel (4) and diagnosing a problem within the chemical processing vessel (4) and/or a problem with a process occurring within the chemical processing vessel (4), the scanning system comprising:

a scanning apparatus comprising at least one radiation source (2) and at least one detector (3) configured to enable scanning of the chemical processing vessel (4) to generate density profile data for the chemical processing vessel (4);

a computing system (5) comprising a data storage (6) for storing the density profile data, a processor for processing the density profile data, and a display (8) for displaying a user interface configured to enable a user to select and view the density profile data on the display (8); and

data processing software configured to generate the user interface and implement the method according to any preceding claim for diagnosing a problem within the chemical processing vessel (4) and/or a problem with a process occurring within the chemical processing vessel (4).

12. A computer program configured to implement the method according to any one of claims 1 to 10 for diagnosing a problem within a chemical processing vessel (4) and/or a problem with a process occurring within the chemical processing vessel (4).