**BPH GLOBAL LIMITED**
**ACN 009 104 330**

13 June 2024

Company Announcements Platform
Australian Securities Exchange

# Seaweed-sourced energy R&D program further refined - focus on biohydrogen and essential mineral extraction

**Highlights**

- **Key features of the R&D program:**
  - **Fermentation: Harvested seaweed to be processed by fermentation (Anaerobic Digestion).**
  - **Biohydrogen Extraction: Production of biohydrogen/biogases as a natural by-product of fermentation.**
  - **Essential Mineral and Nutraceutical extraction: Fermentation to unlock essential minerals and nutraceuticals.**
  - **Artificial Intelligence technology (AI): AI to be developed and deployed to enhance essential mineral and nutraceutical identification and extraction.**
  - **Commercialisation: R&D focussed on potential commercialisation opportunities.**

The Board of BPH Global Ltd (ASX: BP8) (**Company**) is pleased to announce that the Company has further reviewed and refined its R&D program, and in particular, its Seaweed-sourced energy R&D program.

The Company had previously announced that it was expanding its R&D program to include R&D into the extraction of individual macro minerals and micro minerals from seaweed and sea plant biomass, to enable the sale of those macro and micro minerals to the commodities markets, and to industry specific markets such as the battery industry, and thereby create additional revenue streams for the Company. In that same announcement, the Company also stated that it would investigate both pyrolytic and non-pyrolytic/low heat extractive strategies to determine the highest yield of targeted essential minerals and chemical compounds out of selected seaweed species.

Since that announcement, the Company has continued to review and refine its R&D program. In doing so, the Company has considered factors such as environmental impacts and benefits; development costs; prospects of achieving proof of concept; and the likelihood of successful commercialisation. The Company has decided to focus its R&D on the non-pyrolytic/low heat process of fermentation (Anaerobic Digestion) as its preferred extractive strategy. The process of fermentation produces an intermediate liquid product from which essential minerals (and nutraceuticals) can be extracted. In addition, a by-product of that fermentation process is the production of biogases, principally biohydrogen and biomethane.

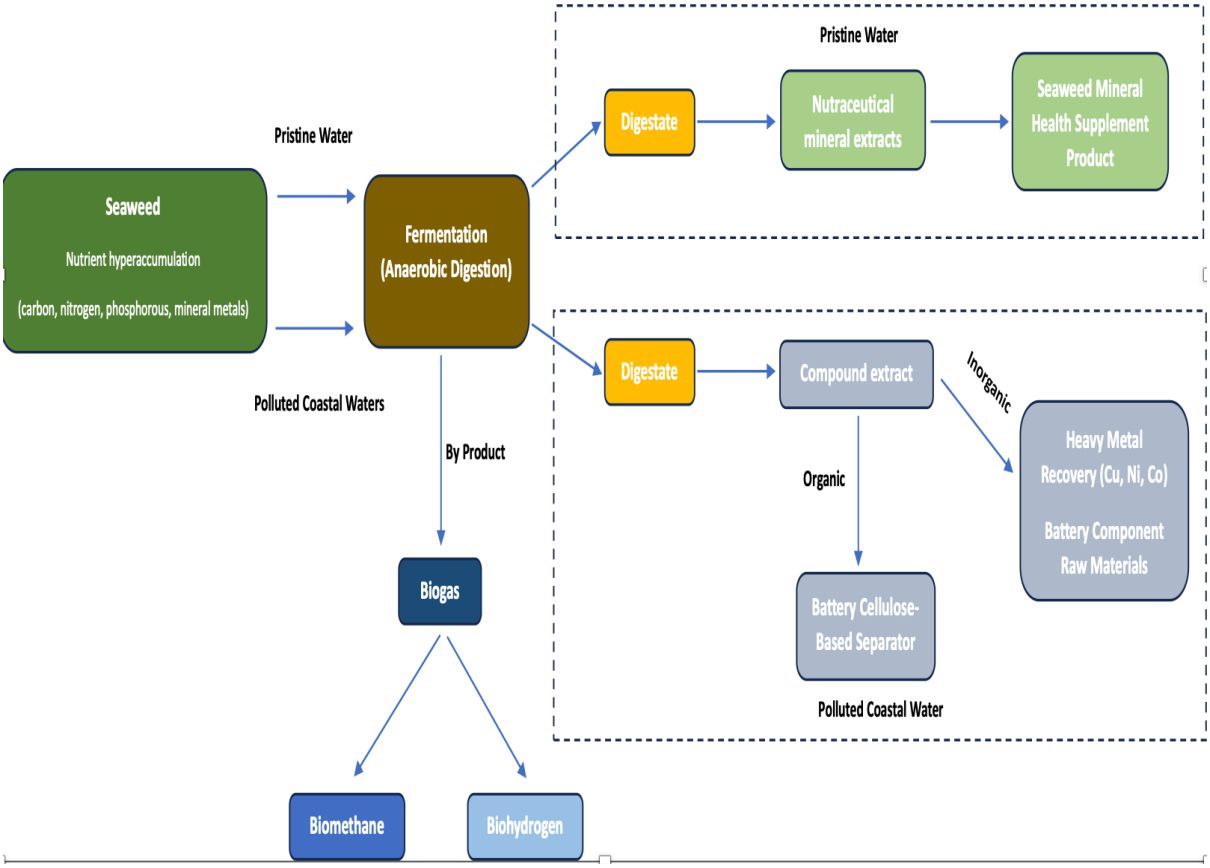
Consequently, the Company has decided it will now focus its energy related R&D program on these two related activities:

- Production and extraction of biohydrogen/biogases; and
- Extraction of essential minerals.

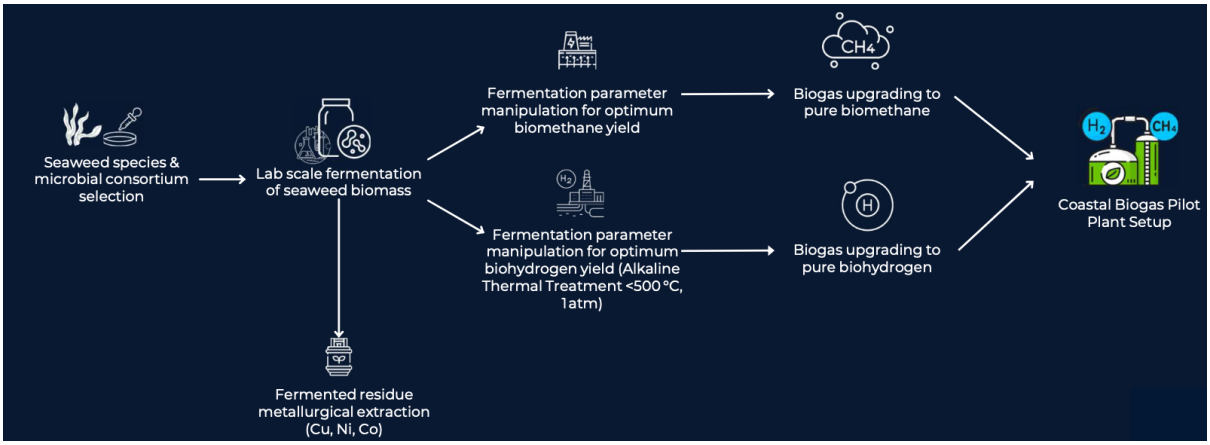
**1. Biohydrogen/biogas production**

- **Production of biohydrogen/biogas a natural by-product of fermentation**: The process of fermentation (Anaerobic Digestion) transforms seaweed biomass to an intermediate liquid product from which essential minerals (and nutraceuticals) can be extracted. A by-product of that fermentation process is the production of biogases, principally biohydrogen and biomethane. A major source of renewable energy, biogas is created by the breakdown of organic matter in the absence of oxygen. It is produced by the anaerobic digestion of various organic materials including municipal waste, farm waste, food waste and energy crops. The Company will undertake a R&D program on the production of biogases from seaweed as a by-product of the extraction of essential minerals and nutraceuticals from seaweed. Biogas can be stored in tanks and transported. Biodigesters reduce methane emissions, making biogas a smart and valuable climate and clean air energy solution.

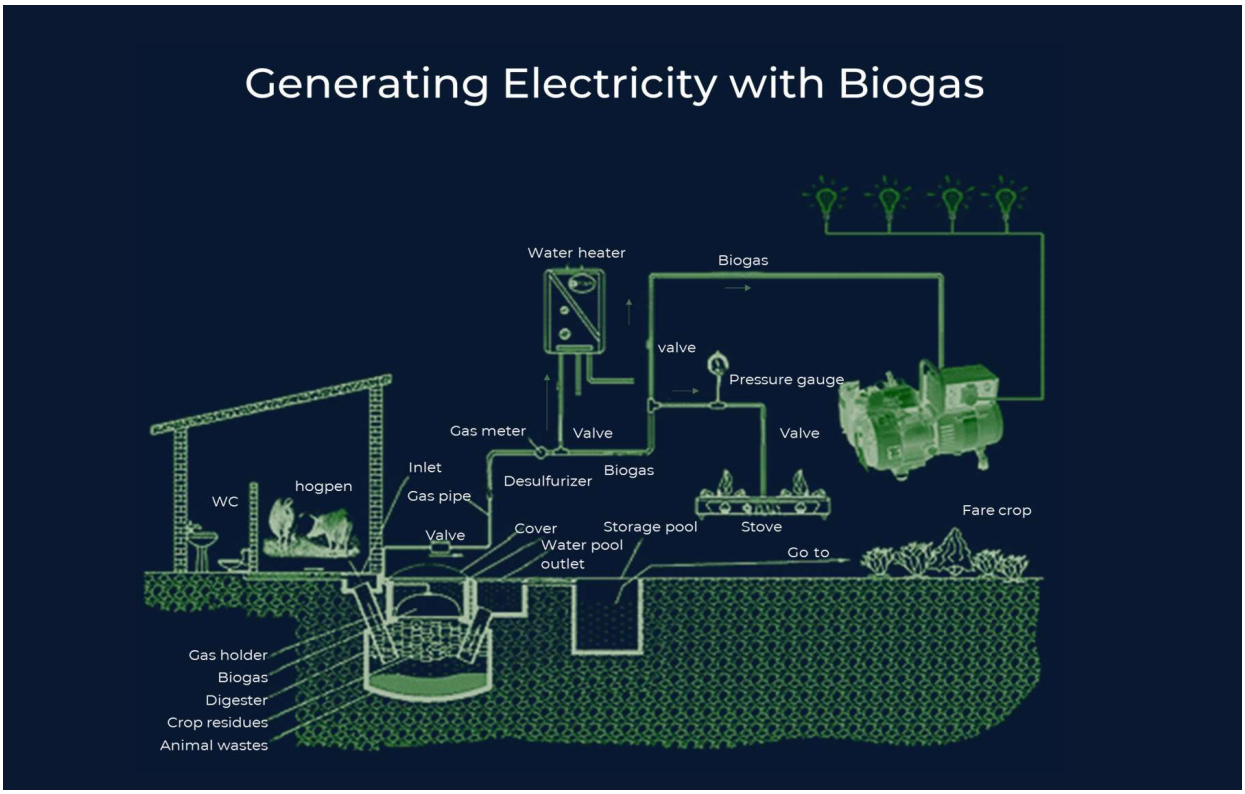
**Illustration of the Company's R&D Program regarding the extraction of essential minerals from seaweed using the fermentation extractive method and the production of biogases (biohydrogen and biomethane) as a by-product**



- **Proposed R&D program and pathway to commercialisation:** The Company's R&D program regarding the production of biogases from seaweed will focus on the:
  - production of pure biohydrogen and biomethane through a process of upgrading the biohydrogen and biomethane yields obtained from the fermentation process;
  - use of pure biohydrogen and pure biomethane as the fuel source for a coastal biogas pilot plant; and
  - sale of biohydrogen and biomethane to energy companies.




- **Biogas Genset System:** Biogas can be used as a fuel to generate electricity using a small scale genset. Biogas is converted to mechanical energy through an internal combustion engine. The mechanical energy rotates an electric generator which produces the electricity.



- **Benefits of Biogas:**
    - **Reduces Emissions:** Cuts methane and black carbon emissions;
    - **Clean Energy:** Provides cleaner fuel for cooking, lighting, and electricity;
    - **Sustainable:** Offers an alternative to traditional fossil fuels;
    - **Resourceful:** Harnesses organic waste to create valuable energy resources; and
    - **Environmental Impact:** Promotes self-sufficiency and contributes to a greener future.

**2. Essential Mineral Extraction**

As previously announced, the Company has pre-existing capabilities and operations regarding the extraction of nutraceuticals from seaweed that the Company can leverage for the development of its seaweed-sourced energy R&D program. There is also substantial overlap in the potential to further develop those operations and capabilities. These principal capabilities and operations are:

- **Germplasm Seedbank:** The Company has previously developed a germplasm seedbank comprising different strains and species of microalgae with distinct traits collected and stored in a seed repository. This germplasm seedbank was developed with a focus on seaweed grown in pristine waters as a raw food and for the extraction of nutraceuticals for use in food, nutrition and cosmetic products. The Company will now develop an additional germplasm seedbank dedicated to different strains and species of seaweed which have a high mineral content and which can grow successfully in waters polluted by heavy metals. Strain specific traits (growth rates, morphology, and essential mineral content) will be recorded as part of the seed library and for future breeding reference purposes.

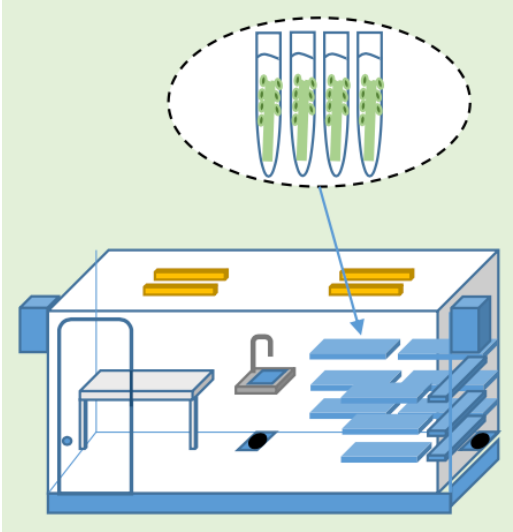
Seed Bank for different Macro algae

- **Artificial Intelligence (AI) Genetic Algorithm:** The Company has developed an AI generated genetic algorithm which enables machine determination of variations in a seaweed genome.

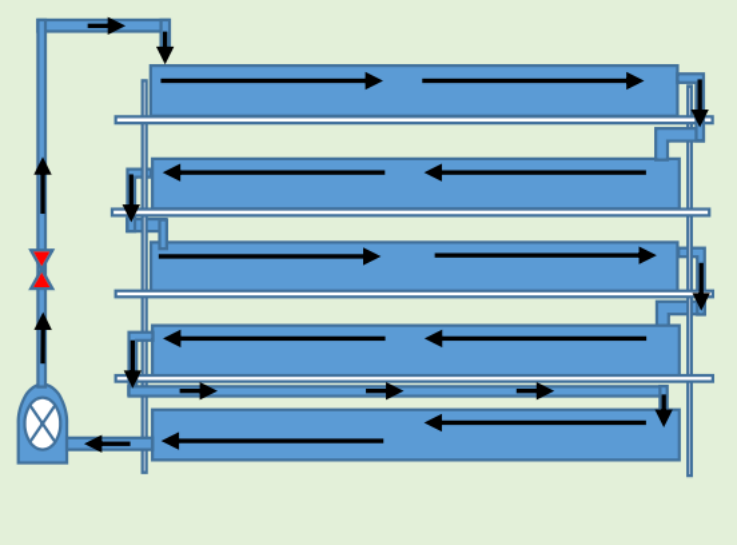
This technology can be utilised for breeding as well as gene editing purposes. The Company will apply this technology to, amongst other things:

- identify naturally occurring essential mineral rich seaweed strains;
- identify which seaweed strains with desired traits will be cross bred to produce new improved strains; and
- select seaweed strains and species which can be acclimatised to local seawater conditions, particularly those waters which are polluted by heavy metals.

- **Precision Cultivation Systems:** The Company has previously developed proprietary technical production technology which includes desired seedlings, nutrient formulation and standard cultivation system implementation processes. The Company will now apply this proprietary technology and associated processes to cultivation of seaweed strains high in essential mineral content. The Company will investigate optimum growth factors for selected seaweed species (light intensity, temperature, essential mineral profile) and determine the suitable substrate inoculation strategy for mass cultivation.

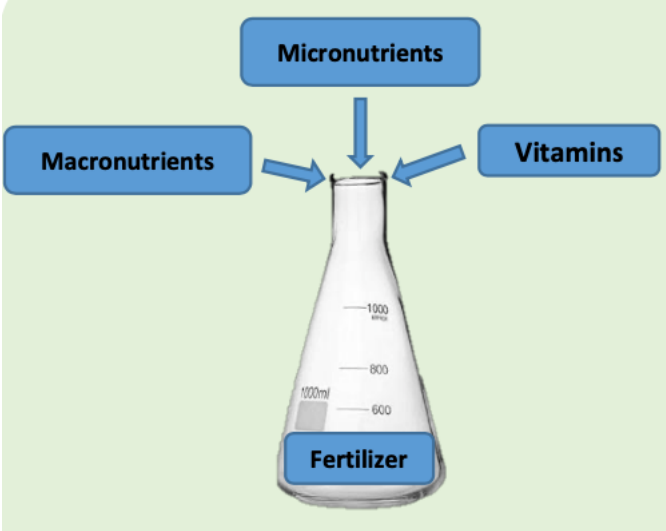


Seed bank seaweed strain cultivars for mass production



Vertical, multi-tier stack system with even water circulation. Footprint efficient.

LED lighting spectral recipe optimized for species specific macroalgae

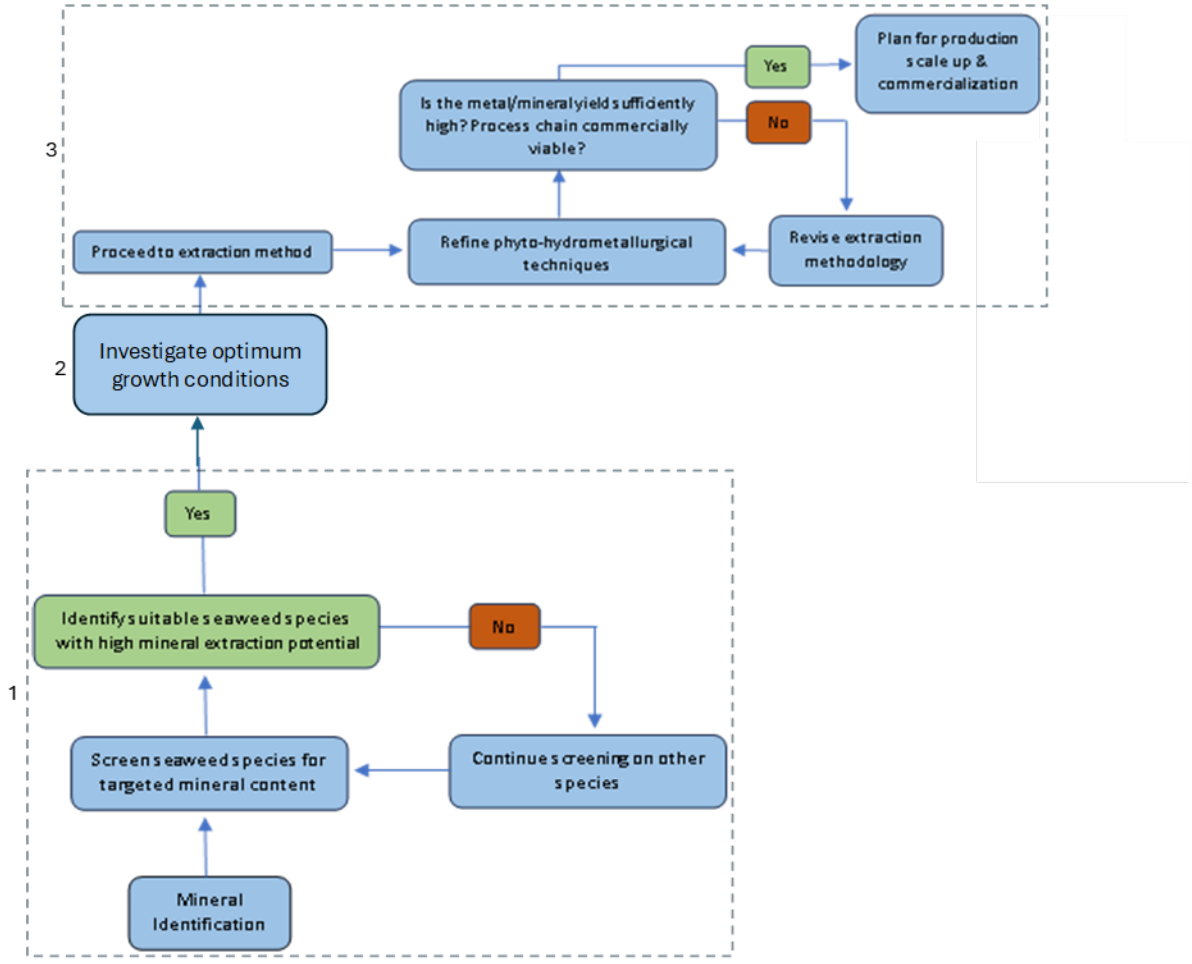



Seaweed nutrient recipe, proprietary formulation for species specific macroalgae

- **Fermentation to unlock essential minerals (and nutraceuticals):** In the Company's previous announcement regarding its seaweed R&D program, the Company stated that it would investigate both pyrolytic and non-pyrolytic/low heat extractive strategies to determine the highest yield of target compounds out of selected seaweed species. Following further investigation and consideration of factors such as energy use and environmental effects, the Company has decided not to proceed with a pyrolytic extraction strategy. Pyrolysis is the heating of an organic material, such as seaweed biomass, in the absence of oxygen at temperatures ranging from 500° to 800°C to produce an intermediate liquid product from which essential minerals (and nutraceuticals) can be extracted. In the Company's view, the pyrolytic extraction method, being both energy and carbon intensive processes, would prove to be both expensive and have adverse environmental impacts. The Company has decided to focus its R&D on the process of fermentation (Anaerobic Digestion), a non-pyrolytic/low heat process as its preferred extractive strategy. The process of fermentation produces an intermediate liquid product from which essential minerals (and nutraceuticals) can be extracted.
- **AI-enhanced extraction:** The Company has previously developed and deployed Phyto-hydrometallurgical techniques in its seaweed operations to identify and extract nutraceuticals for infusion into food, nutrition and cosmetic products. The Company now plans to leverage

these existing Phyto-hydrometallurgical techniques to identify and extract essential minerals from seaweed. In addition, the Company plans to develop and deploy artificial intelligence (**AI**) driven imaging technology to further enhance essential mineral identification and isolation so as to increase the effectiveness of its Phyto-hydrometallurgical techniques to extract essential minerals from seaweed.

- **Commercialisation:** For essential mineral extraction for sale into the commodities markets and for use in the battery technology and energy production industries, the initial specific focus is on copper, nickel and cobalt. The Company also continues to monitor the results of published research regarding the use of seaweed-derived chemicals and cellulose micromaterials in enhancing battery performance. Examples of recently published studies include the improvement made by added cellulose micromaterials to battery separators in sodium-metal batteries and to a prototype battery electrode made from a combination of silicon and a seaweed-derived alginate which improved the electrode's elasticity and ability to store energy. Akin to a mining company, BP8 regards itself as a potential supplier of essential minerals, including these seaweed-derived cellulose micromaterials and alginates, to the current and emerging battery technology and battery manufacturing industries.




- **Environmental benefits:** The Company notes the important environmental benefits that can result from its proposed extraction of essential minerals from seaweed using the fermentation extraction method, particularly, the:
  - remediation of seawater polluted by heavy metals; and
  - non-polluting, energy efficient and carbon neutral features of the non-pyrolytic fermentation process itself.

**Company's existing R&D activity**

The research and development (**R&D**) that the Company intends to undertake on the extraction of essential minerals from seaweed using the fermentation extractive method and the production of biogases (biohydrogen and biomethane) as a by-product is in addition to the Company's existing R&D activity which is focusses on:

- Edible bird's nest product enhancement by the infusion of seaweed-derived nutrients; and
- Creation of a range of prototypes for food products, dietary supplements, healthcare products, and cosmetic applications that incorporate seaweed-sourced and/or bird's nest-sourced nutraceuticals.

Nutraceuticals sourced from seaweeds will also be extracted using the fermentation extraction method.

**The way forward**

The Company will provide regular updates on all aspects of the R&D plan and the achievement of R&D plan milestones.

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Authorised for lodgement by the Board of the Company

For further information, please visit our website at www.bp8global.com or contact:

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